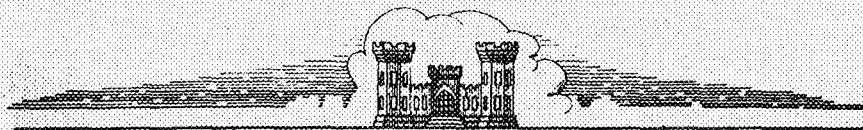


*LEOMINSTER*  
*LOCAL PROTECTION PROJECT*

**MONOOSNOC BROOK**  
**LEOMINSTER, MASSACHUSETTS**

*FINAL*  
*ENVIRONMENTAL STATEMENT*  
*& 404 EVALUATION*



DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS.

JANUARY 1980

SUMMARY SHEET

LEOMINSTER LOCAL PROTECTION PROJECT  
MONOOSNOC BROOK  
LEOMINSTER, MASSACHUSETTS

1. NAME OF ACTION: ( x ) Administrative ( ) Legislative

2. DESCRIPTION OF ACTION:

A (tunnel approximately 3,200 feet long and 12-foot in diameter) will be constructed from Rockwell Pond to Monoosnoc Brook. In addition the Monoosnoc Brook's channel will be modified and approximately 3 acres of stream bank will be graded to allow for better drainage.

3. ENVIRONMENT IMPACTS:

a. Beneficial. The action will protect the downtown portion of Leominster from severe flooding.

b. Adverse. The building and maintaining of the diversion tunnel will have two significant environmental impacts, and two impacts of lesser concern. The major impacts involve the disposing of excavated materials from the tunnel and the retaining of water in the tunnel between diversions. Those of lesser importance include the filling of a portion of Rockwell Pond and the grading of approximately three acres adjacent to the brook.

4. ALTERNATIVES:

(1) flood proofing; (2) excavation; (3) other tunnel locations; (4) dam; and (5) no action.

5. COMMENTS REQUESTED:

Federal

Historic Preservation Council

HUD

EPA

Department of Commerce

Department of Health, Education and Welfare

Department of Interior

State

Massachusetts Audubon Society  
State Archeologist  
Massachusetts Historical Commission  
Executive Office of Environmental Affairs  
State Clearinghouse  
Office of Planning and Programming Coordination  
Department of Natural Resources

Local

Ralph W. Crossman, Mayor - Leominster  
Chamber of Commerce  
J. Harold Temay, Mayor - Fitchburg  
Regional Planning Commission  
City Councils

I PROJECT DESCRIPTION

1. Location and Purpose
2. History of Past Flooding
3. Previous Study on Flooding Problem
4. Features of the Proposed Project

II ENVIRONMENTAL SETTING WITHOUT THE PROJECT

1. Population and Employment
2. History of Local Industries
3. General Description of Area
4. Topography and Geology
5. Climatic Water Quality
6. Air Quality
7. Rockwell Pond
8. Monocanoc Brook
9. Historical and Archaeological Sites

III RELATIONSHIP OF THE PROPOSED PROJECT TO LAND USE PLANS

IV PROBABLE IMPACTS OF THE PROPOSED ACTION

1. Beneficial
2. Adverse

V ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

VI ALTERNATIVES TO THE PROPOSED ACTION

VII RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

VIII ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE IMPLEMENTATION OF THE PROPOSED PROJECT

IX COMMENT AND RESPONSES

APPENDIX A

Coordination comments, study results, and other material.

APPENDIX B

404 Evaluation.



## 1.00 PROJECT DESCRIPTION

1.01 Location and Purpose. The proposed Leominster Local Protection Project will be located in the city of Leominster, county of Worcester, State of Massachusetts. The city is situated 38 miles west of Boston and 21 miles north of Worcester, Massachusetts (See Figure 1). The purpose of the project is to decrease flooding in downtown Leominster.

1.02 History of Flooding. In the past, the central business district of Leominster has been flooded by waters from Monoosnoc Brook. The flooding has been mainly due to flash runoff which is sometimes augmented by melting snow.

1.03 Records of previous floods in this area are meager. Local newspaper files indicate that a damaging flood occurred at nearby Fitchburg in 1850, but details on this flood are lacking. The most severe flood in Leominster occurred in March of 1936 when five inches of rain fell between the 16th and the 19th. This flood was also augmented by melting snow and a previous storm. The flood is considered a "40 year event", meaning floods of this magnitude can be anticipated once every 40 years. Of course, this is only a probable prediction; similar floods could happen two years in a row or not happen for 50 or 100 years.

1.04 The second largest flood occurred on 26 September 1938. It resulted from a hurricane which traveled up the Connecticut River Basin. The storm dropped 7.5 inches of rain in the Leominster area.

1.05 The third largest flood occurred from the 14th to the 17th of October, 1955. Although the exact amount of rain which fell on Leominster is unknown, the nearby town of Ashburnham had 11.96 inches during these four days.

1.06 The 1936 record flood produced peak flows of 2,000 cubic feet per second (cfs) through the city of Leominster. The present channel can only carry 800 cfs; therefore a storm as intense as the one in 1936 would discharge 1,200 cfs into the city. In 1936, seventy acres of the city were inundated.

1.07 In designing the structures necessary to prevent this type of flooding, the Corps used what is known as the Standard Project Flood: the flood that may be expected from the most severe combination

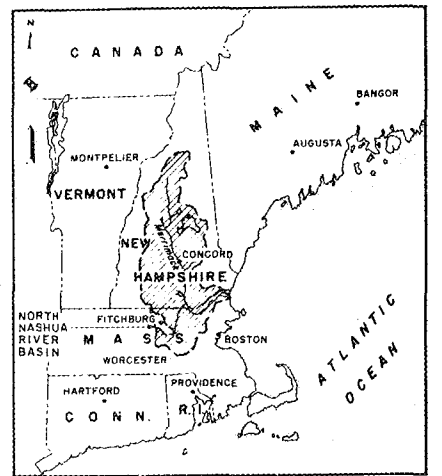
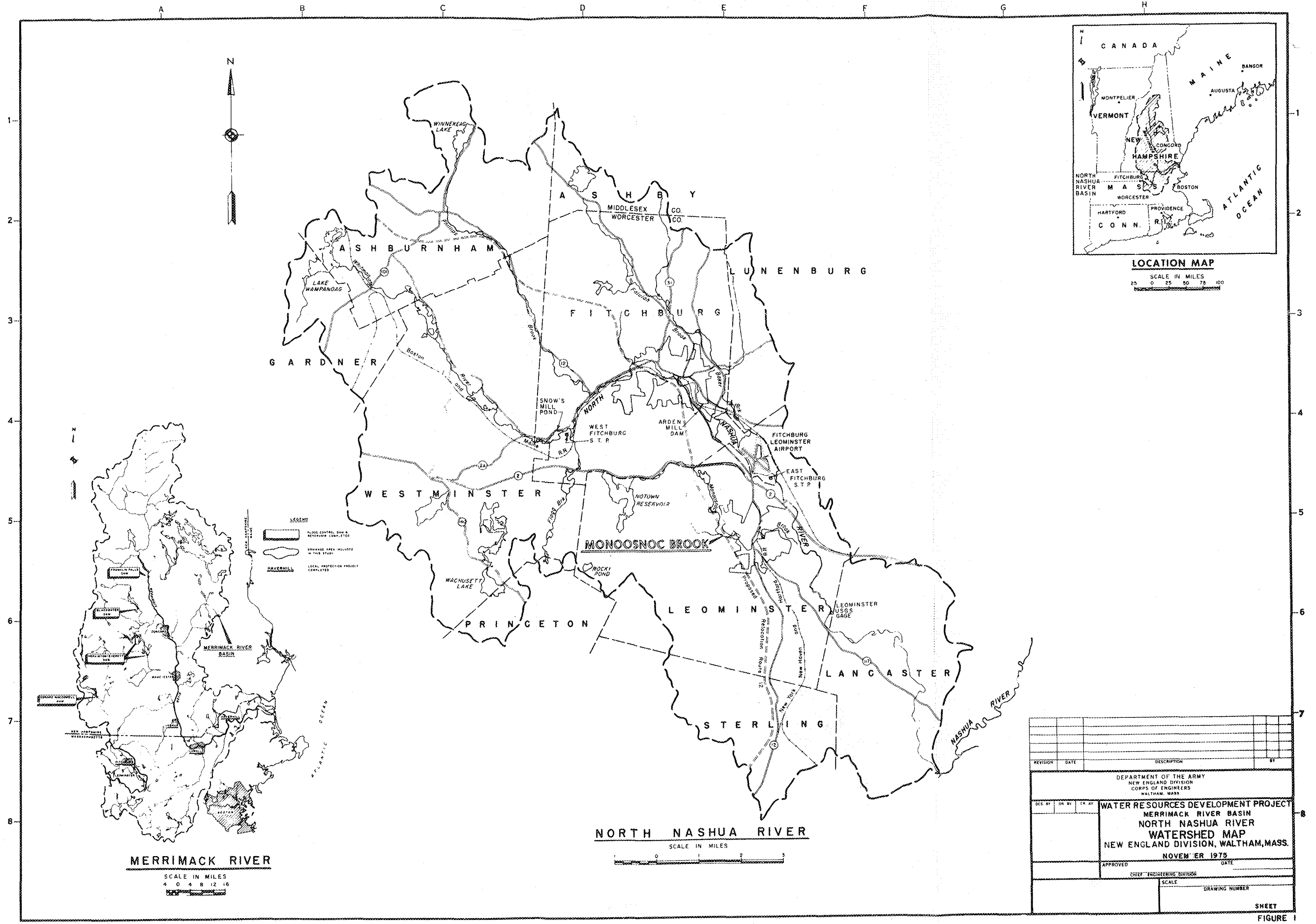
of weather and runoff conditions that are reasonable for the geographic region. (See Figure 2). For Monoosnoc Brook the Standard Project Flood would produce 4,000 cfs at Rockwell Pond. A comparison of normal brook flows and various flood conditions are listed below:

#### Monoosnoc Brook Water Flows

Average (Main Street Bridge)	30 cfs
Summer minimum	1-5 cfs
Present safe channel capacity	800 cfs
Flood of Record	2,000 cfs
Standard Project Flood	4,000 cfs

1.08 Previous Studies of Flood Problems. Local flood protection improvements along Monoosnoc Brook were recommended for the city of Leominster in the North Nashua River Basin Report (NNRBR) by the Corps' New England Division dated 25 January 1965. Recommended improvements included construction of an upstream multi-purpose 90 acre reservoir that would provide a storage capacity of 2,000 acre feet: 1,200 acre feet for water supply recreation and 800 acre feet for flood control. Proposed channel improvements along the river consisted of removal and replacement of existing walls, removal of a small dam, capping of old walls, protecting slopes with stone, and general clearing and straightening portions of the existing channel. Additional contiguous improvements were proposed in an Urban Renewal project through the central business district. The improvements would have relocated 2,400 feet of channel, removed four undersized bridges, and improved the existing channel where required. The Urban Renewal Project was an integral part of the overall flood damage prevention project for Monoosnoc Brook, and would have had to be accomplished by local interests.

1.09 The Urban Renew Project was rejected in its entirety by the Leominster City Council on 30 September 1969. The Mayor requested the Corps' original plan be modified to include the entire channel for improvements. But since the engineering and economic feasibility had to be reassessed, as well as the cost to the city, the project was reclassified to a "deferred category" in November 1969. The Monoosnoc Lake project, as authorized by Congress, would have provided storage for flood control, water supply and recreation. Since the time of project authorization, the city of Leominster has made arrangements with the Commonwealth of Massachusetts Metropolitan District Commission for additional water supply and this is no longer a project purpose.



**LOCATION MAP**  
SCALE IN MILES  
0 25 50 75 100

REVISION	DATE	DESCRIPTION	BY
DEPARTMENT OF THE ARMY NEW ENGLAND DIVISION CORPS OF ENGINEERS WALTHAM, MASS.			
<b>WATER RESOURCES DEVELOPMENT PROJECT</b> <b>MERRIMACK RIVER BASIN</b> <b>NORTH NASHUA RIVER</b> <b>WATERSHED MAP</b> NEW ENGLAND DIVISION, WALTHAM, MASS. NOVEMBER 1975			
DES. BY	CHK. BY	DATE	
APPROVED		DATE	
CHIEF ENGINEERING DIVISION		SCALE	
		DRAWING NUMBER	
		SHEET	

FIGURE 1

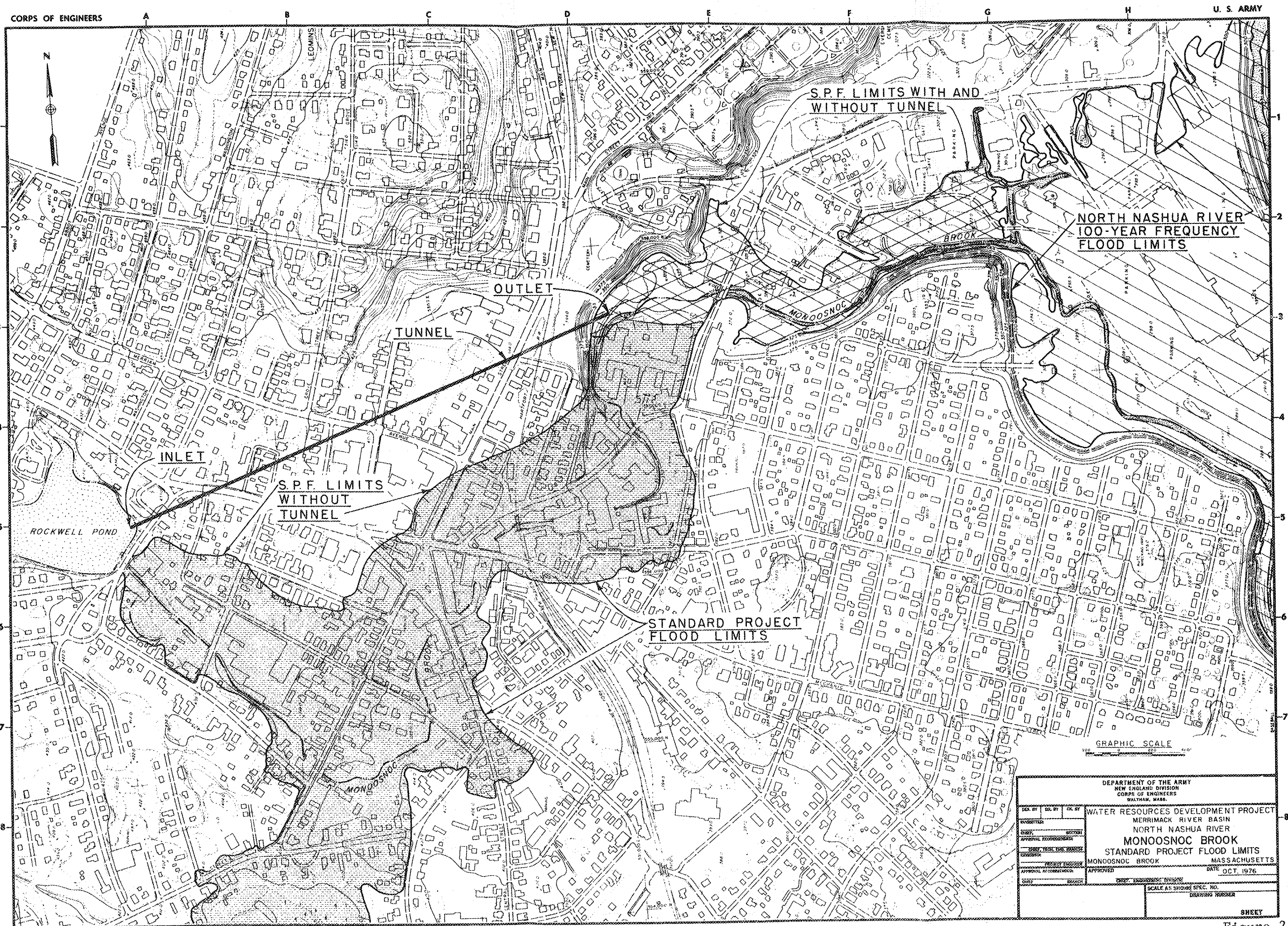


Figure 2

Therefore, it was necessary to review the projects' feasibility and economics for providing an upstream dam for flood control and recreation only, and the project was again reclassified to a deferred status in July 1971.

1.10 Although conditions have remained fairly constant through the city proper since 1965, other features along the brook have changed significantly. A large shopping center was constructed on the floodplain at the confluence of the Monoosnoc Brook and the North Nashua River in January 1966. The development eliminates a sizable area of the natural flood storage area along the brook.

1.11 On 5 June 1972, Congressman Robert F. Drinan, Mayor Crossman of Leominster, and other local officials requested that the Monoosnoc Brook and Lake Project be reactivated and removed from its deferred status. No resolution was required for the re-study, as it was originally authorized under the Flood Control Act of 1966 (Senate Document 113/89/2). The re-study was started in August 1974 and funded by the Public Works Appropriation Act of 1975 (Public Law 93-393 dated 28 August 1974), under the general investigation provision.

1.12 Features of the Proposed Project. The Corps studied a number of alternatives (See Section six for complete discussion) for protecting downtown Leominster from flooding. The alternative selected calls for the diverting of floodwaters from Rockwell Pond through a tunnel and discharging the waters into Monoosnoc Brook between Water and Whitney Streets (See Figure 3).

1.13 The project's features will include the following:  
(a) decreasing the length of the existing weir at Rockwell Pond;  
(b) a capped inlet structure; (c) 3,200 feet of 12 foot diameter concrete lined tunnel; (d) regrading the stream bank and catch basin drainage system, and relocating some utilities.  
Each portion of the project will be discussed in greater detail below.

(a) A portion of the weir at Rockwell Pond will be modified to control flood waters in the existing channel. The excess waters will flow into the tunnel, and no more than 600 cfs will be discharged over the weir. This will allow for 200 cfs of water to flow into the brook from the city. The channel will carry water at a safe capacity.

(b) At the northwest corner of Rockwell Pond will be a capped morning glory. (See Photo I and Figure 3 & 4). This structure will be similar to a funnel discharging into the vertical shaft.

(c) The tunnel will be 12 feet in diameter at the inlet, it will drop 107 feet vertically, run horizontally for about 3,200 feet, and then rise 56 feet to the surface. The tunnel would operate when the water level on Rockwell Pond rises one foot above normal elevation, and would discharge 3,400 cfs of water during a Standard Project Flood.

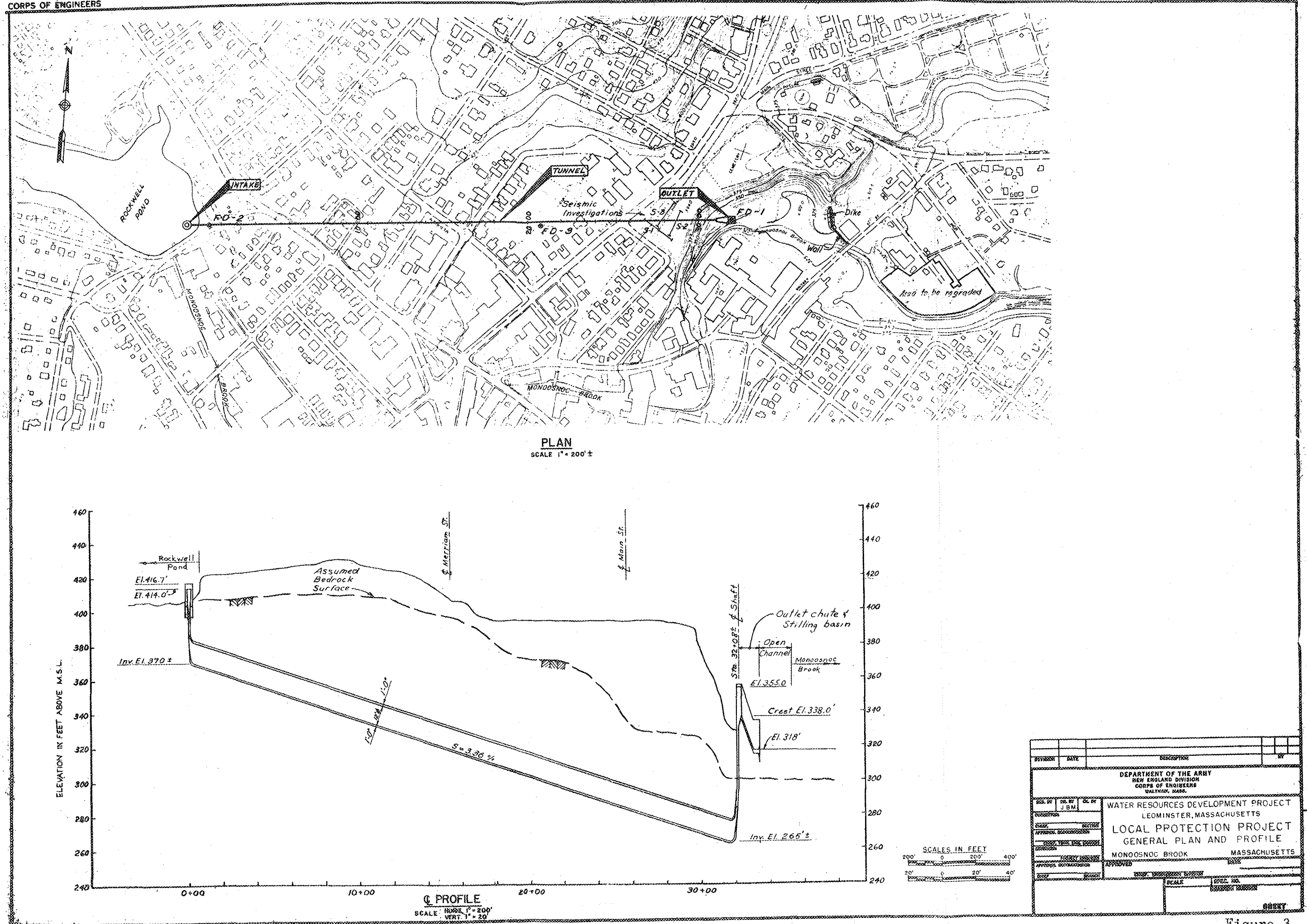
(d) The outlet will consist of a concrete flume and stone slope protection along the outlet channel. In addition, large rocks will be placed in the channel to allow for aeration of the tunnel's waters. (See Photos 15 and 16 and Figure 5).

(e) From Whitney Street to William Street, approximately 3 acres of bank near the Pyrotex Corporation will be graded to allow floodwaters to drain away from the building. Also, a low area next to Pyrotex Corporation building will be drained by a catch basin and 485 feet of reinforced concrete pipe. (See Figure 3 and Photo 17).

1.14 The city will participate in certain aspects of the project. Some utilities will require relocation, and two sewer lines must be moved; one at the end of Williams Street and one under Whitney Street bridge, this will allow for the unobstructed flow of water down the Monoosnoc Brook. The city will be required to accomplish these items.

1.15 No other flood control projects are located or proposed on Monoosnoc Brook. Although there is work scheduled for the North Nashua River, it will not conflict with this project.





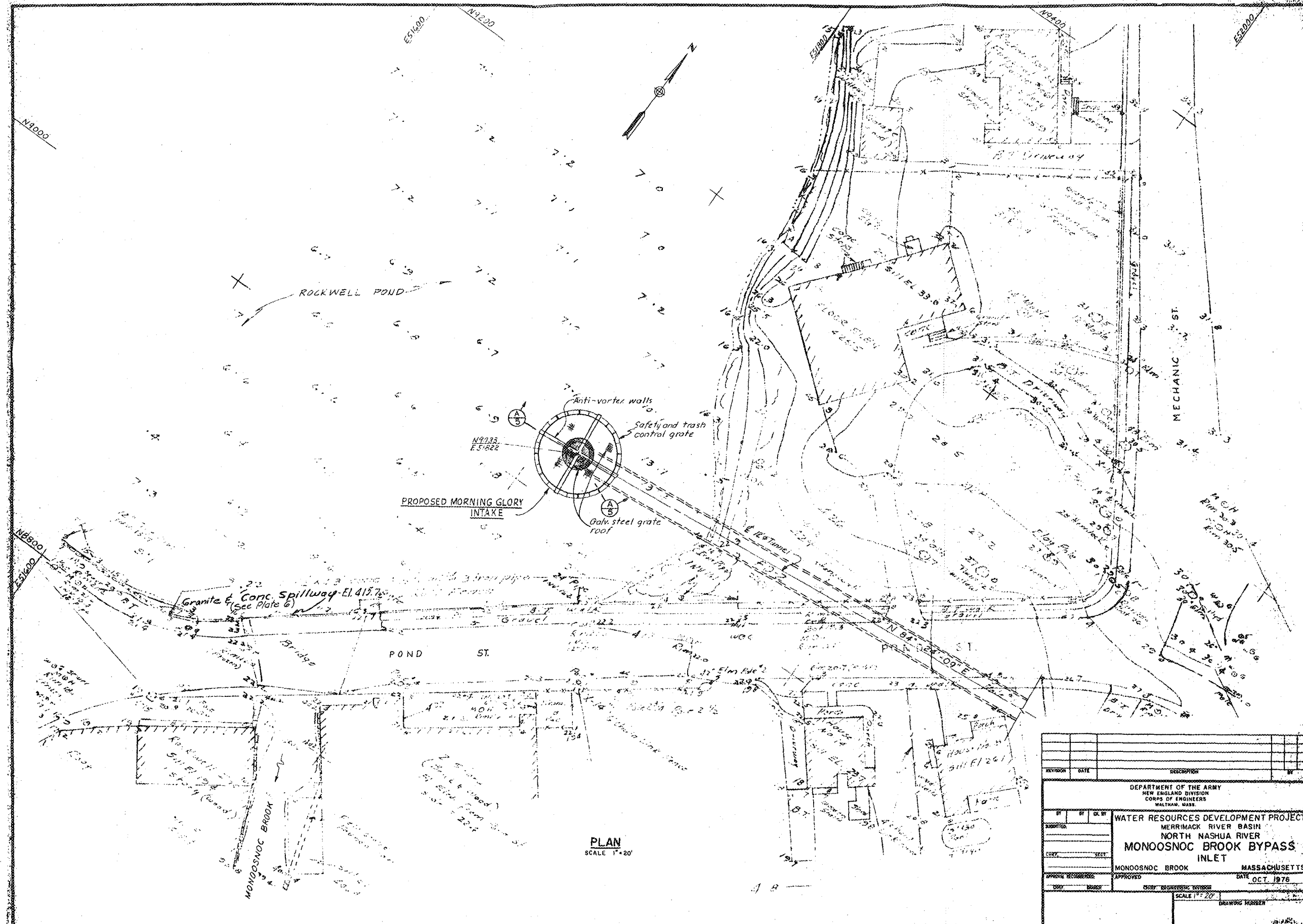


Figure 4



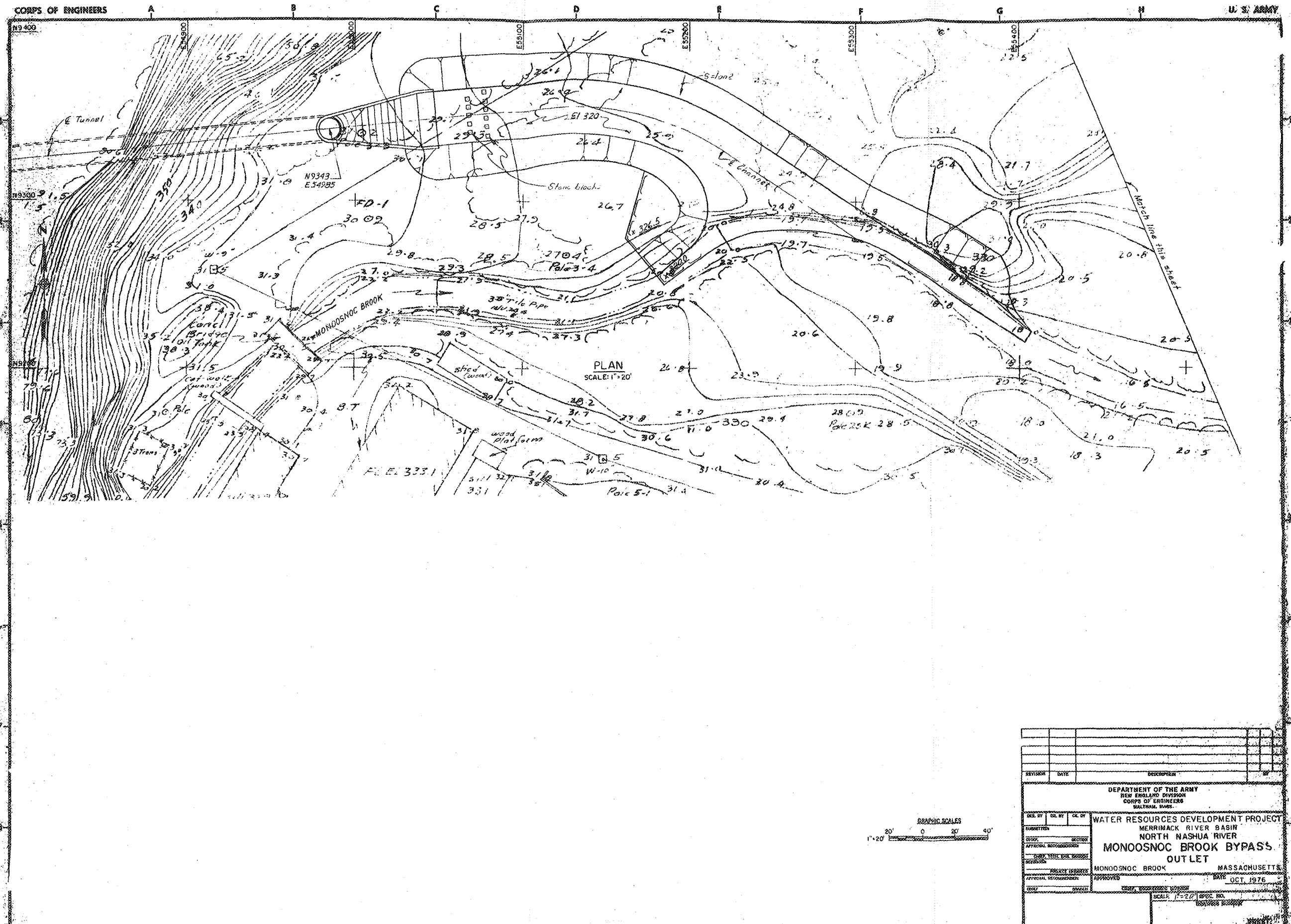


Figure 5

## 2.00 ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.01 Population and Employment. The population of Leominster as of the 1970 census was 32,939. This was an increase of 18 percent from the last decade. The increase came about because of the birth and migration of people into the area; the increase, however, appears to be decelerating due to a drop in births and not a slowdown of migration.

2.02 Over half of the total labor force is involved in manufacturing. Manufacturing has been an essential part of the local economy almost from the first settlement of the area.

2.03 History of Local Industry. Leominster was established in 1740 and incorporated as a city on 13 May 1915. For the first 50 years, the economy was primarily agricultural, but the comb making industry replaced it around 1770. This industry grew to encompass 24 factories by 1845. Other industries also developed. It is estimated that at one time 75 percent of all piano cases were manufactured in Leominster; however, the industry died out by 1935. The evolution of industrial adaptability again took place when the area became a major producer of tanned leather, then baby carriages, then skirts, as well as a large number of other small items.

2.04 In 1970, 650 firms in the Fitchburg-Leominster Standard Metropolitan Statistical Area employed over 62 percent of the working population. The five largest manufacturing groups, by magnitude of employment, were plastics, apparel and finished goods, machinery (except electrical), furniture and paper. Second in employment was wholesale and retail trade. It appears that the city will continue along as a manufacturing area for the foreseeable future.

2.05 Description of Area. Leominster is bordered by Fitchburg on the northwest, Lancaster on the east, Sterling and Princeton on the south and Westminster on the west. (See Figure 1). Fitchburg and Westminster are also industrial cities, while the other towns are more rural.

2.06 Topography. The Monoosnoc Brook is located along the eastern margin of the New England upland in central Massachusetts. This is a region of moderate relief characterized by wide valleys and broad, steep sided hills, affording watersheds which are conducive to rapid runoff.

The watershed is a fairly steep basin having a total fall of 550 feet along 8.7 miles of stream, and drains approximately 11.2 square miles to its mouth. The brook rises in the hills immediately west of the city, and flows easterly through Notown Reservoir then parallels U.S. Route 2 through several small dams in residential areas until it reaches Rockwell Pond just above the city. From the pond, it flows northerly to the North Nashua River.

2.07 Geology. Remnants of glacial outwash occupy the bottoms of many of the major valleys. Variably thick deposits of glacial fill lie above the outwash and along the slopes of the region. Bedrock along the project is a grey, dense, hard, unweathered phyllite at the intake end and a similarly grey, hard schist at the outlet site, with both forms intermingling between. The rock lies between 7 and 70 feet below the surface. Above the bedrock lies varying quantities of overburden consisting of silty and gravelly sands.

2.08 Climate. The watershed's climate varies with temperatures ranging from below 0° to almost 100°F. The average annual temperature is 48°F. Freezing temperatures can be expected from late September until late April. The watershed frequently experiences periods of heavy precipitation. This is due to local thunderstorms, and large weather systems. The basin lies in the path of the prevailing "westerlies" which cross the country and produce frequent weather changes. The average annual precipitation in the Monoosnoc Brook area is about 45 inches; and the precipitation is uniformly distributed throughout the year. Snowfall averages about 60 inches. The water content in early spring often totals four to six inches.

2.09 Water Quality. The quality of the water found in Monoosnoc Brook, its tributaries, and Rockwell Pond varies markedly. (see Appendix ).

2.10 The waters above Rockwell Pond are classified as Class "A" by the State of Massachusetts. Under this classification, the water must have the following characteristics: the dissolved oxygen content must be at least 75 percent of saturation for at least 16 hours per day. The total coliform bacteria cannot exceed an average value of 50 counts per 100 ml during any monthly sampling period. Color, turbidity, pH, odor and taste should be of natural origin.

2.11 Rockwell Pond and the main stem of Monoosnoc Brook are classified as "B" waters. Class "B" waters must meet at least the following conditions: the dissolved oxygen content must be above 75 percent of saturation for at least 16 hours of the day, but should never go below 5 mg of dissolved oxygen per liter at anytime. The total coliform bacteria counts should not exceed an average value of 1,000/100 ml nor more than 1,000 in 20 percent of the samples.

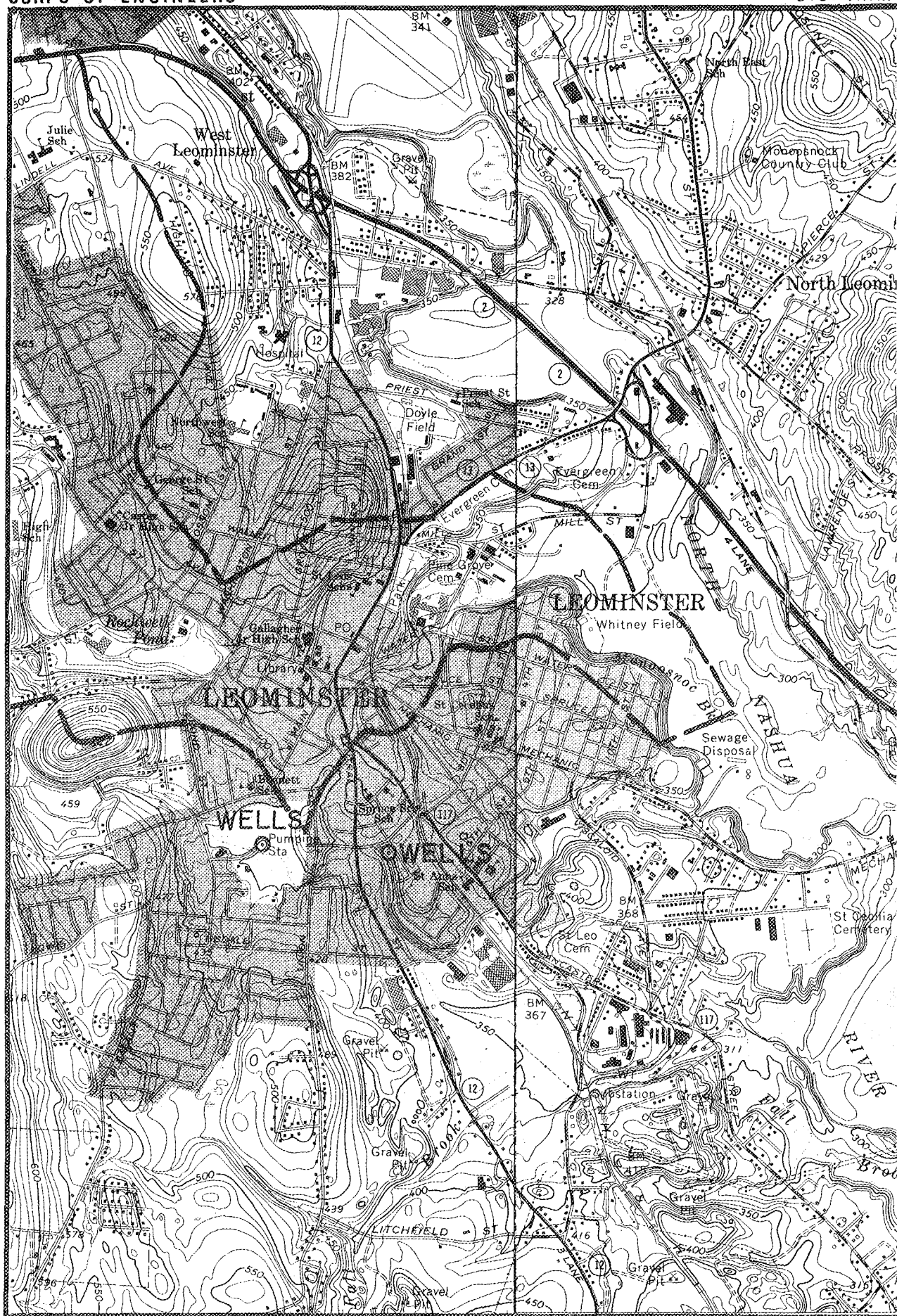


Figure 5A

Color, turbidity, taste, odor and chemicals should be present in concentrations such that no impairment of Class B users will occur. No discharges should be permitted which are harmful to humans and aquatic life. (It is our understanding that there is a leak from a sewer line under Rockwell Pond.)

2.12 Existing Water Supplies. The city of Leominster has its own municipal water supply system with three surface and two ground-water sources. In recent years the city has been supplementing these sources with water from the state Metropolitan District Commission system. (See Figure 5A for well locations.)

2.13 Air Quality. No Federal or State air quality measuring stations are in Leominster; however, there are stations in Fitchburg. Since Fitchburg is a larger and more industrialized city than Leominster, the air quality should be poorer than Leominster.

2.14 The Massachusetts Department of Public Health measures concentrations of sulphur oxides ( $SO_2$ ), carbon monoxide, Total Suspended Particulates, hydrocarbons, nitrogen dioxide ( $NO_2$ ) and photochemical oxidants ( $O_3$ ). In their measurements from July 1974 to June 1975 ozone ( $O_3$ ) was the only State or Federal standard violated.

2.15 High concentrations of ozone are fairly common in Massachusetts, especially in May, June, and July, and this has recently attracted much concern. The ozone is produced as sunlight reacts with nitrogen dioxides and other pollutants. Therefore the increase in ozone is more of a problem in outlying areas than cities. This is because the chemical transformation requires time, and is accomplished as polluted air drifts away from an urban area. In the case of Fitchburg and Leominster, high ozone concentrations can be partially attributed to pollutants being transported from Springfield by southwesterly winds.

2.16 Since most of the flood protection features can be found from Rockwell Pond to the North Nashua River, that section will be treated with more detail.

#### ROCKWELL POND

2.17 The pond is a shallow body of water approximately 1,300 feet long and 750 feet at its widest, and has a total surface area of 12.5 acres. Homes border much of the pond. A long dam and concrete weir make up the eastern shoreline (See Photo 1-3). Rockwell Pond is owned by the Salisbury Heirs family, but Jafal Corporation has water rights.

2.18 Vegetable and Animal Life. Common shade trees and bushes are found along the pond's perimeter. The trees in the area include the sugar maple (*Acer saccharum*), black oak (*Quercus velutina*), red oak (*Quercus rubra*), white birch (*Betula papyrifera*), American elm (*Ulmus americana*), and weeping willow (*Salix babylonica*). In many areas grass covers the banks' slopes to the water's edge. Many small mammals and birds inhabit the fringe around the pond.

2.19 The pond supports profuse growths of water plants. The following species can be found within the pond's waters: common elodea (*Elodea canadensis*), farwell watermilfoil (*Myriophyllum farwellii*), whorled watermilfoil (*Myriophyllum verticillatum*), and spirogyra (*Spirogyra spirogyra*). There is also a small marshy area (approximately 60' x 40') along the northeast corner of the pond covered with cattails (*Typha latifolia*) (See Photo 1). The abundance of plant life in the pond's waters indicates that nutrients have been added to the water (See Photos 4-6).

2.20 The pond holds a substantial population of animal life. In samplings conducted by the Corps, microscopic organisms were found, (such animals as copepods, rotifers, oligochates, waterfleas, clam shrimp, hydra and many others). There is also an abundance of frogs, white suckers, blacknose lace, pumpkinseed, hornpout. Ducks are also found in the area.

2.21 Monoosnoc Brook Below Rockwell Pond. Downstream from Rockwell Pond, Monoosnoc Brook passes under one railroad and nine highway bridges as it flows through the city proper, a distance of about 2.3 miles. Much of the stream has been walled-in between Pond and Water Streets, and several areas are confined in conduits. The brook is cluttered with debris and obstructions along its entire route through the city. Such objects as logs, branches, shopping carts, tires, bicycles, bottles and plastic pieces clog the channel; in addition there are several filled-in dams and concrete building supports in and along the brook. Debris collects at these obstructions and the bridges and occasionally causes the water to back up. (This happened in 1972 when water backed up and flooded buildings near Central Street).

2.22 About one mile above the brook's confluence with the North Nashua River, the slope flattens out forming a sizable floodplain. The Searstown Shopping Plaza lies on this floodplain.

2.23 Approximately 300,000 gallons per day of municipal water is presently discharged directly into Monoosnoc Brook. This is about 3% of the total daily municipal water consumption. During the summer the discharge could conceivably account for over 50% of the total brook's volume.

2.24 Most of this discharge water is clean cooling water although some is seriously polluted, containing large amounts of floating plastic dust, oil and grease, surfactants, nitrates, nitrites, ammonia, phosphorus and some metals.

2.25 Approximately 900 lbs. of solids float down the brook daily. According to a E.P.A. Industrial Discharge Permit application, most of the material is a fine, inert plastic dust. It is discharged principally by the Paragon Plastics Company along with oils and other material which produces turbidity. The Environmental Protection Agency has been in contact with Paragon Plastics; it is anticipated that the discharge will be cleaned up or terminated soon.

2.26 Plant and Animal Life Along the Brook. Vegetation along the brook varies. Any places where buildings abut, there is none; however a great many oaks, maples, birches, beeches, elms, poplars and willows do inhabit the brook's banks. Along the brook are also found small shrubby and scrub plants (See Photos 7-11).

2.27 The Massachusetts Division of Fisheries and Wildlife found that Monoosnoc Brook contains a sizable population of white sucker (Catostomus commersoni). This species tolerates pollution and is indicative of the brook's water quality. Some other fish reportedly present are fallfish (Semotilus corporalis), blacknose dace (Rhinichthys atratulus), common shiner (Notropis cornutus), and pumpkinseed (Lepomis gibbosus). Benthic organisms present include segmented worms, leaches, and nematodes; these organisms are tolerant of pollution.

2.28 The proposed outlet site is a partially wooded vacant lot. The vegetation indicates an area in early succession. Trees present include sugar maple, white birch, black oak, American elm, pine cherry, quaking aspen, and bar oak. (See Photos 15 & 16). Animals observed include grey squirrels, chipmunks, bluejays, chickadees and various other birds.

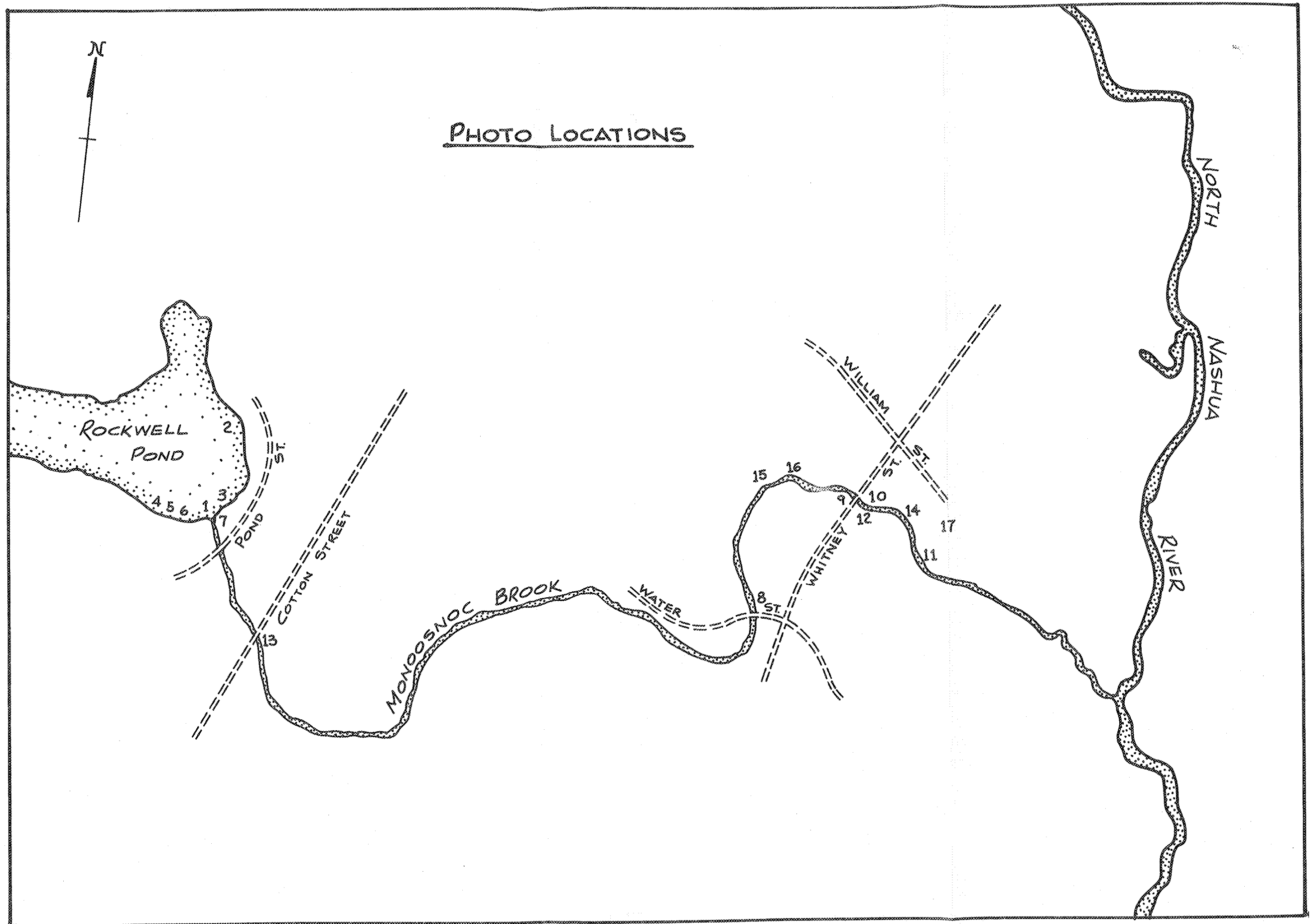
2.29 There are no known rare or endangered species in the area of the project.

2.30 Historical and Archaeological Sites. To determine if there are any present or potential historic or archaeological sites in the project areas, a literature survey was conducted at local and regional academic institutions. In addition, the National Register of Historic Places was reviewed; and the State Archaeologist and the State Historic Preservation officer were also consulted. All sources indicated that there are no known sites within the proposed project area.

2.31 To further assure that the project would not impact unknown cultural resources, a reconnaissance survey was conducted. No archaeological sites were found from this survey. A more indepth survey will be conducted if the project is authorized.



PHOTO LOCATIONS





ROCKWELL POND

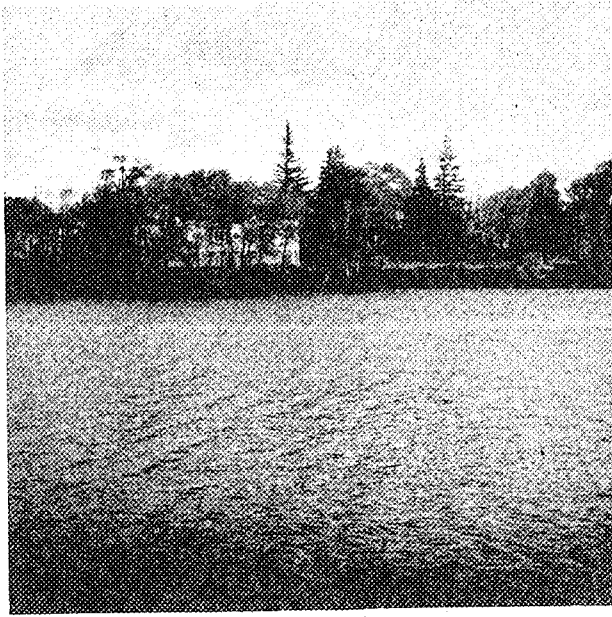


Photo 1

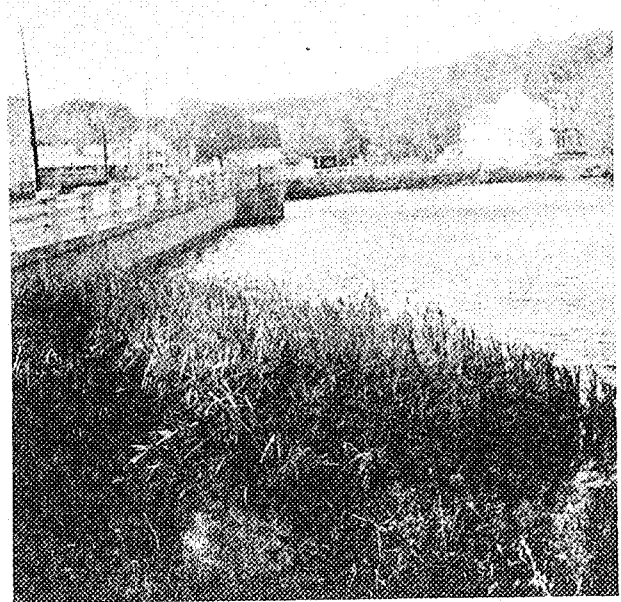


Photo 2

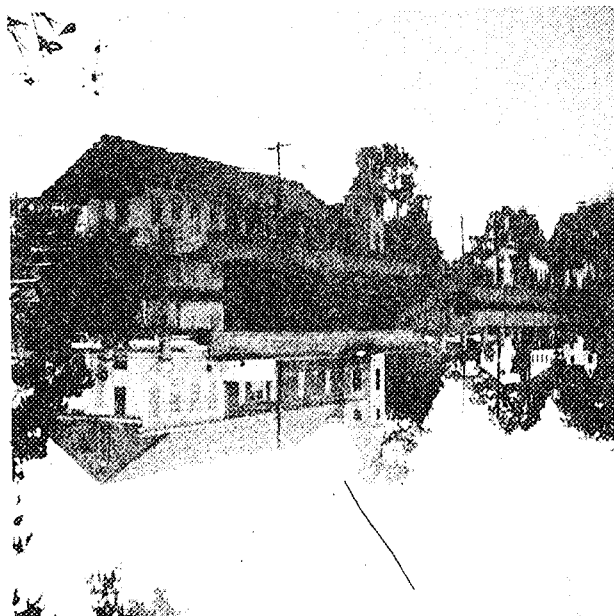


Photo 3

ROCKWELL POND - PLANT LIFE



Photo 4



Photo 5

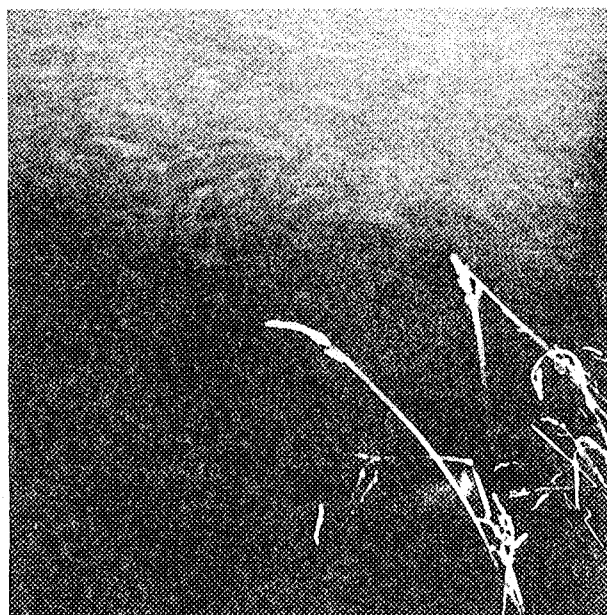


Photo 6

STREAM CHANNEL

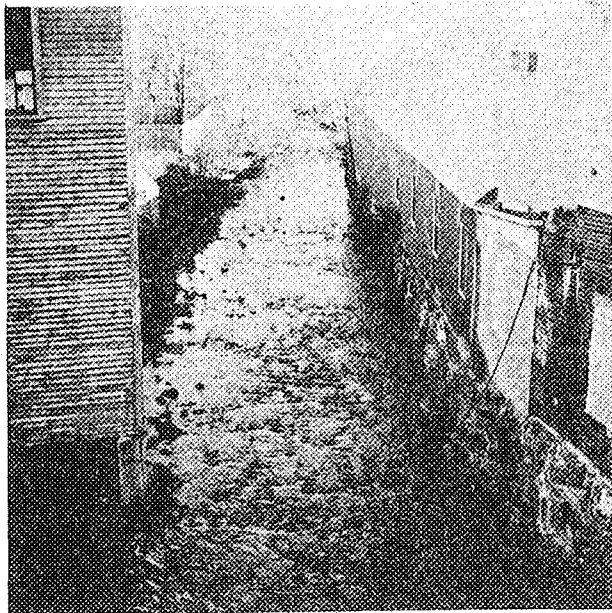


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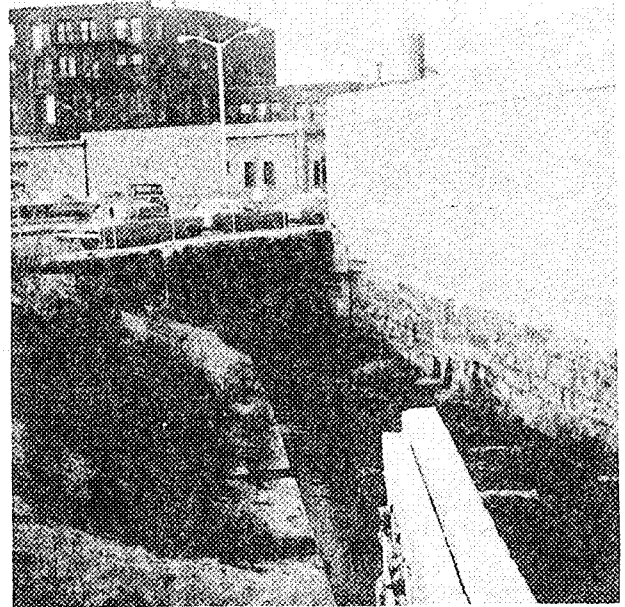


Photo 8

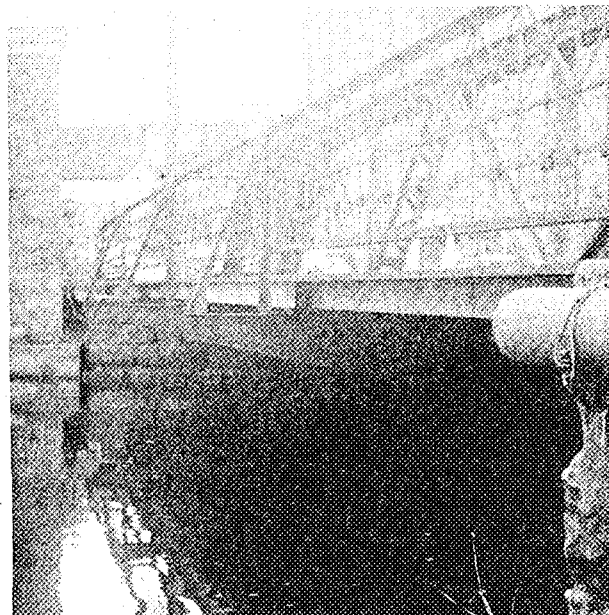


Photo 9

STREAM CHANNEL

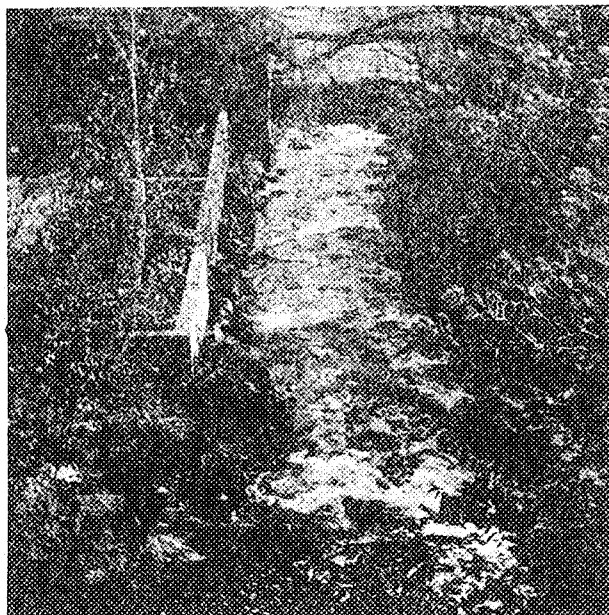


Photo 10

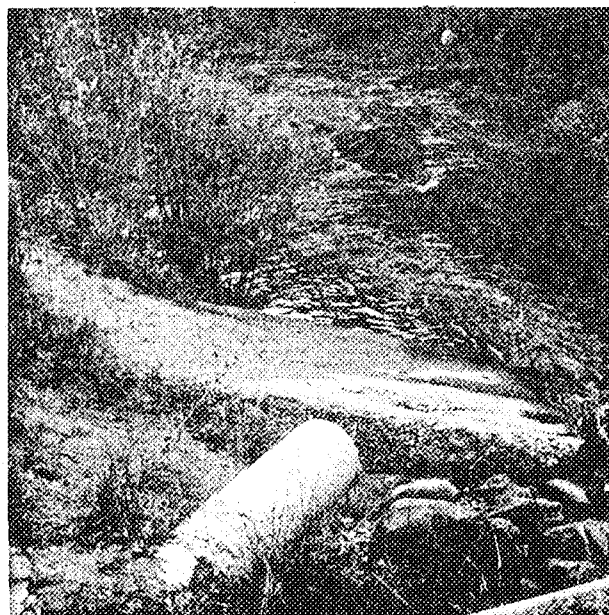


Photo 11

OBSTRUCTIONS IN THE BROOK



Photo 13

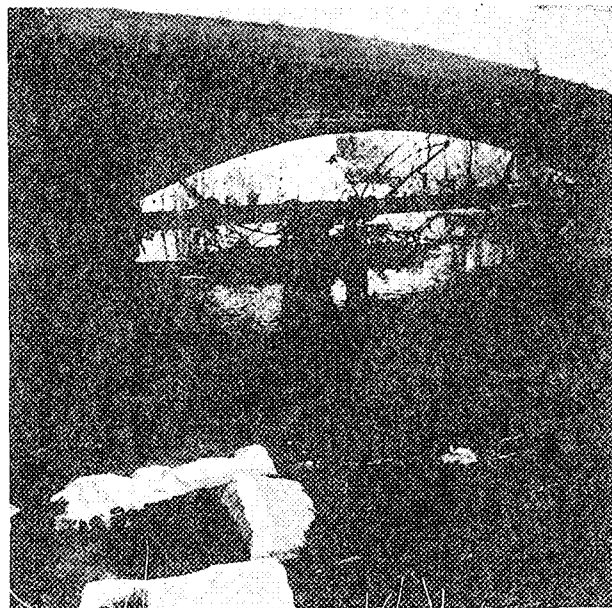


Photo 14

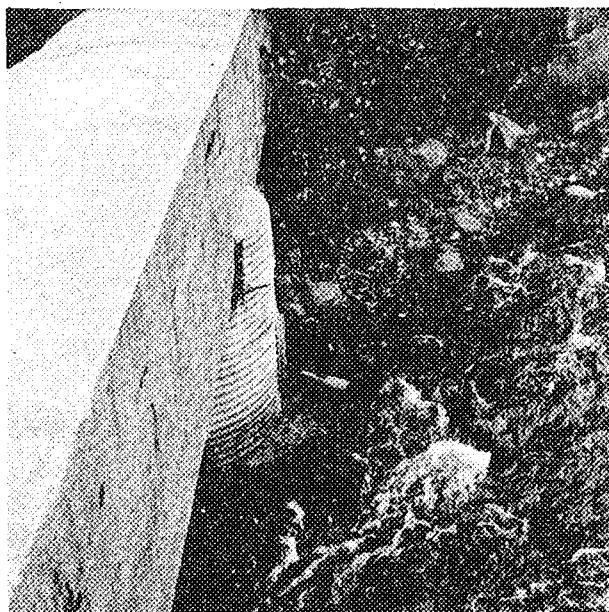


Photo 15



OUTLET SITE

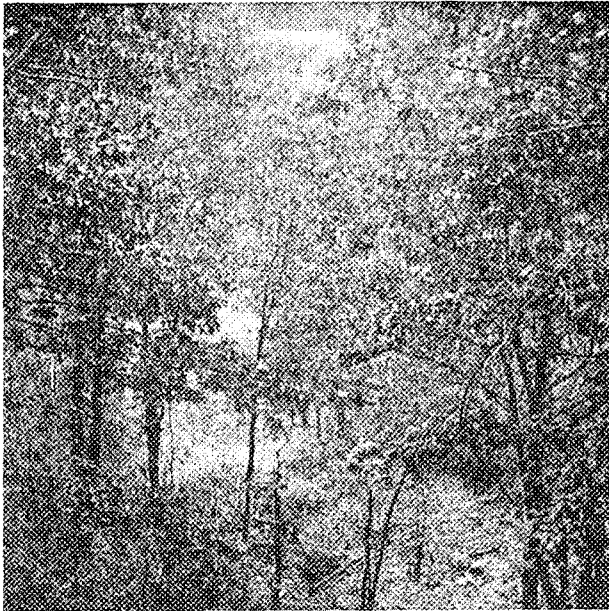


Photo 16

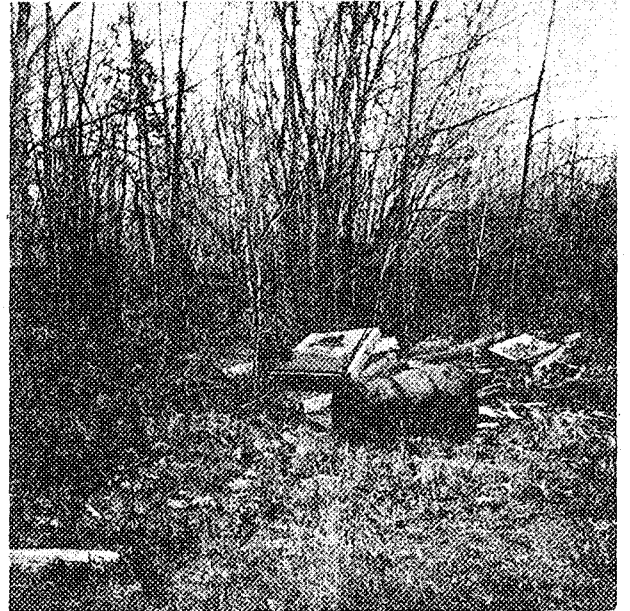


Photo 17

AREA TO BE GRADED



Photo 18

### 3.00 RELATIONSHIP OF THE PROPOSED PROJECT TO LAND USE PLANS

The diverting of floodwaters from Rockwell Pond, the grading of 3.1 acres, and the modification of the brook's channel will not conflict with any present uses of these lands. On the contrary, the measures for controlling floods will allow the existing land uses to continue with greater safety, since there will no longer be the threat of severe floods.

#### 4.00 THE PROBABLE IMPACTS OF THE PROPOSED ACTION

The environmental consequences of the proposed action can be subdivided into beneficial and adverse impacts.

The beneficial impacts will result from the protection of homes and industries that will no longer incur an economic loss due to flooding and from the temporary increase in jobs during construction. There may also be some intangible benefits to the local residents from a sense of security during floods.

4.01 The adverse impacts will result from an increase in noise, dust and traffic congestion during construction. The biological community will be impacted from the disposal of materials taken from the tunnel, from the water retained in the tunnel between diversions, and from modifying the brook's channel.

4.02 Further discussion on these points will be presented in this section.

4.03 Beneficial. The Corps conducted a study in 1974 to determine the amount of money saved by the local people if the flood prone properties were protected. Based on this survey and using 1974 prices, it is estimated that a flood of the proportions of the 1936 flood would result in losses of \$3,252,300. Commercial property would incur 45% of the damages, industrial 38.4%, residential 13.6%, and the public 3.0%.

4.04 Of course, not all floods would be of this magnitude; therefore various stages of flooding were combined with their possible frequency. This would give some indication of the expected annual losses - in this case \$438,980 (1974 prices). Consequently the city's residents could expect on the average to reduce their flood losses by this amount annually.

4.05 The construction of the structures to protect against flooding could temporarily boost the local economy. Projects such as this usually employ about 75% of their labor force from the local area. Since it is anticipated that the project will take two years to complete, this could mean a substantial lift to the local area. Furthermore, some supplies for construction will invariably be purchased locally and this will further add to Leominster's economy.



4.06 Adverse. Dust, noise, and traffic congestion are nuisance impacts which can arise from most major construction. These impacts can be controlled by wetting dusty areas, by having devices on equipment that will reduce noise, and by properly scheduling activities to reduce traffic congestion. Fortunately, most construction will take place in relatively secluded areas; therefore these impacts will be reduced.

4.07 Approximately 20,000 yards of material will be removed in constructing the tunnel. (About 10% of the excavated material can be used as fill at the Pyrotex Corp.) Of course, this material will require disposal. Present plans call for the Contractor to assume this responsibility. However, the proper Federal, State and local governmental bodies will have review authority, and the Corps will have final say as to the site's acceptability. This should insure that the site selected is environmentally acceptable, and diminish the possibility of conflicts.

4.08 The retaining of 360,000 cubic feet of water in the tunnel between diversions could also create a problem. Depending upon the organic material and the bacteria present in the water, the possibility exists that the water in the tunnel could go anoxic - the bacteria decomposing the organic matter could consume most of the oxygen. If this continued long enough, the dissolved oxygen content could be sharply reduced. When this water is discharge into the brook, it could create a problem for man and for those organisms present in the brook.

4.09 To evaluate the severity of this problem, tests were conducted to determine what happens to dissolved oxygen content of the pond water under simulated tunnel conditions.

4.10 In May of 1976, samples of pond water were taken at the proposed site of the intake structure. The water was held in a dark room at 50°F; conditions expected to exist in the tunnel. The dissolved oxygen readings were taken about every two days, and tests were conducted from 18th of May to the 21st of June.

4.11 Although the tests were only conducted for a short period and there maybe some doubt as to the reliability of the reading in the later part of the experiment, the results seem to indicate that the dissolved oxygen content in the tunnel's water should not drop below 6.6 mg/l. Water containing this amount of oxygen could support any of the forms of life found in the Monoosnoc Brook. In fact, this level is close to the lower limits trout could survive in (7 mg/l) and trout are very sensitive to dissolve oxygen content. But to further ensure that the oxygen content of the water is high, stone blocks will be placed at the cutlet. This will allow the water to mix with the atmosphere, and increase its oxygen content. The complete study on dissolved oxygen can be found in the Appendix.

4.12 Other Impacts. A small portion of Rockwell Pond will be filled to construct the intake structure. The pond is shallow and marshy in this area. Cattails and watermilfoil are very abundant. The fill would eliminate these plants and the habitat and food source they create. The fill would also cause temporary turbidity in the adjacent areas; thus lowering the productivity of the pond. However, when the construction is finished, the fill will be removed, and the pond should revert to its former state.

4.13 Three acres are to be graded near a manufacturing plant. (see Figure 3). In the past, water has ponded there and caused a problem. The area will be graded so that it slopes towards the brook; thus facilitating drainage.

4.14 The grading will mean the loss of some trees and scrubs, and the habitat associated with them. However, this impact should be slight since the area will be seeded with grasses. Many birds and mammals should re-inhabit the area.

4.15 The project should not adversely impact any cultural resources.

4.16 At the public meeting held in January of 1976, the issue was raised that the tunnel might increase the flooding at Searstown Shipping Center. Since the shopping center is situated on the floodplain between the North Nashua River and the Monoosnoc Brook, there seemed to be some justification for this concern.

4.17 The Corps had previously conducted studies on this problem. The findings were that the brook's water level would increase only about one to two inches, and the waters would arrive about 1 hour sooner than normal because of the tunnel. However, when the North Nashua's flood waters arrive, they would be considerably higher than the Monoosnoc Brook flows causing greater damage.

5.00 ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The following summary displays the adverse impacts which cannot be avoided by this project.

# LEOMINSTER LOCAL PROTECTION PROJECT

## SUMMARY OF ENVIRONMENTAL IMPACTS

		SHORT-TERM			LONG-TERM
B	A		B	A	
	✓	(1) Because of construction, there will be dust, noise, and traffic congestion.		✓	(1) Rockwell Pond may have new current patterns.
	✓	(2) Turbidity as a result of the east corner of the pond being filled in with destruction of some benthic life.		✓	(2) The diversion structure will alter the face of the pond by a permanent loss of a small area of early successional, terrestrial habitat.
	✓	(3) Due to outlet structure construction, a small loss of small animal habitat will occur.		✓	(3)* Flood protection will be provided to approximately 70 acres of the industrialized city proper.
	✓	(4) If water in tunnel becomes stagnant, odors, production of explosive gases, and possibly occurrence of diseases may result. There will also be a deleterious effect on the downstream ecosystem when waters are flushed out.		✓	(4)* Safety factors must be considered--there may be injuries to local population at the intake and discharge structures.
	✓	(5) Waters may go anoxic.		✓	(5) There will be little or no effect on the long term productivity of Monoosnoc Brook and Rockwell Pond.
✓		(6)* A temporary economic boost to the Leominster area.		✓	(6)* Intangible benefits as increased sense of security during flood times.
✓		(7)* A temporary increase in jobs.			
	✓	(8) As a result of outlet construction, there will be a temporary loss of approximately 3 acres of land.			
	✓	(9) Minor impacts on fish, fish eggs, birds, and other mammals which may be lost to the tunnel because of entrapment.			
	✓	(10) Temporary loss of ground cover resulting in possible erosion and nutrient loss.			
	✓	(11)* Temporary aesthetic degradation.			
	✓	(12)* Local community may be disrupted for a short time, or possible displacement.			

B= Beneficial

A= Adverse

\*= Possible Social Impacts

## 6.00 ALTERNATIVES TO THE PROPOSED ACTION

6.01 To meet Leominster's needs for flood protection, a number of alternatives were considered. These included a surface diversion from Pierce Pond and smaller scale channel improvements; the draining of Rockwell Pond for use as a flood storage reservoir; underground diversion of storm waters; and nonstructural alternatives such as flood proofing, or excavation of the flood area.

6.02 The first alternative, a diversion stream from Pierce Pond, became unattractive when condominiums were built in the path of the diversion. Because of topographical conditions, there is no feasible way around these dwellings. The value of these building and associated lands now precludes the diversion.

6.03 It was proposed to drain the pond and create a park; in the event of a storm, the park would fill and function as a reservoir. Investigations showed however, that Rockwell Pond could only store 15 minutes of runoff from a Standard Project Flood and this is clearly not sufficient for flood control.

6.04 Several nonstructural alternatives were considered including evacuation, floodplain zoning, and floodproofing. As figure 6 shows, approximately 85 acres of Leominster were inundated by the flood of 1936. A Standard Project Flood would be even greater. Evacuating flood prone structures would be costly and disruptive to the community.

6.05 Because the city is heavily built-up and the basin is rather steep, a diversion tunnel was considered to be least disruptive and most economical. A simple underground tunnel was first proposed, but borings and seismic investigations indicated the bedrock was not where expected. Because of this, expensive tunneling through sand would be necessary as would costly tunnel supports. This tunnel could not be justified because of its expense.

6.06 A deeper tunnel was then proposed. Such a scheme would call for tunneling almost exclusively through bedrock. Boring through bedrock is more economical than excavating through looser material and creates fewer engineering problems.

6.07 The deep tunnel currently appears to be the best solution for protecting Leominster. It is a sound engineering solution, and economically justified; and if maintained, should cause few environmental problems.

6.08 If no action is taken, flooding across parts of the city will continue.

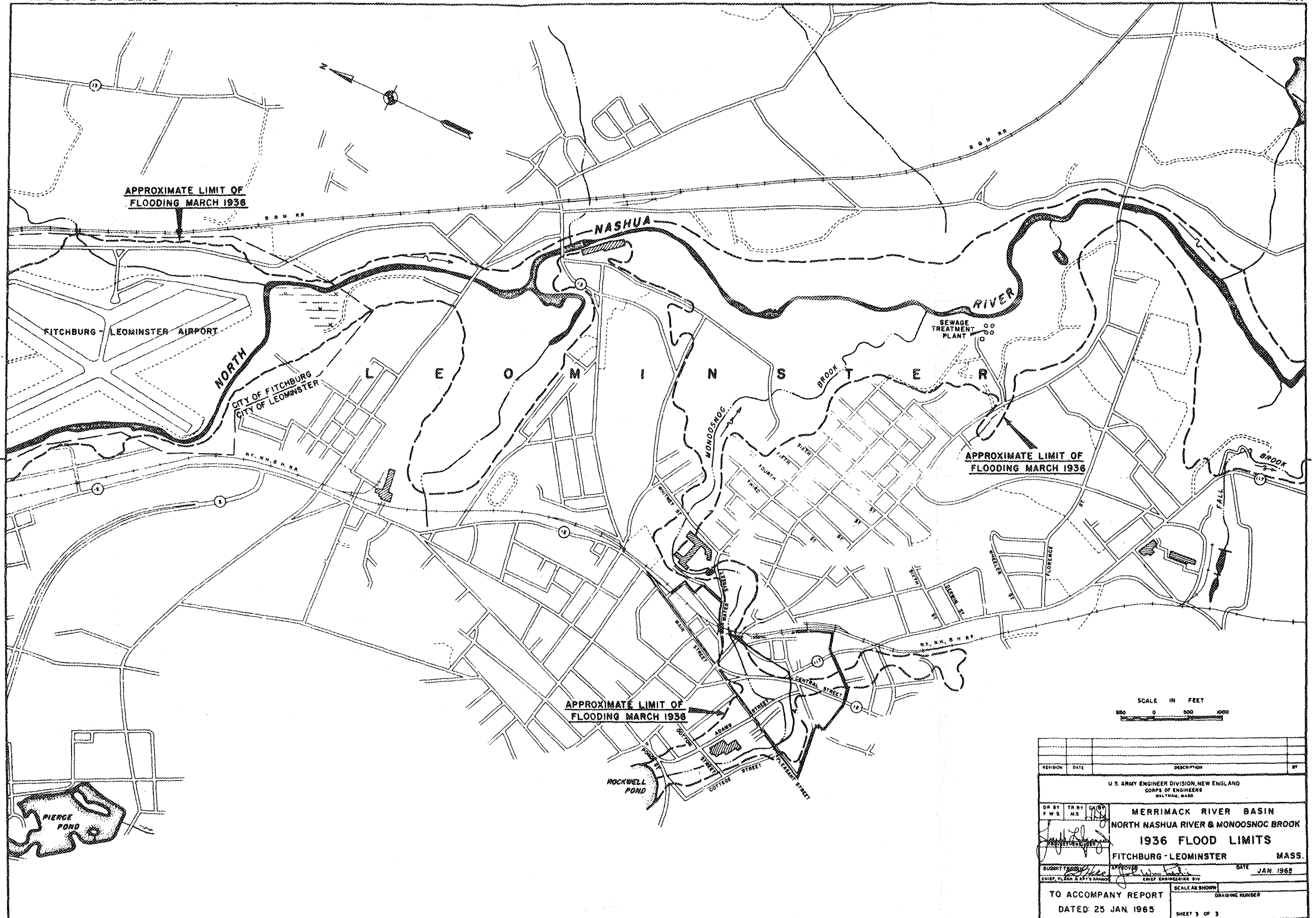


Figure 6

7.00 THE RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S  
ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF  
LONG-TERM PRODUCTIVITY

The projected life span of the Leominster Local Protection Project is 100 years. It is likely, however, that such a structure will stand until man chooses to modify or dismantle it. The project will have little or no effect on the long-term productivity of Monoosnoc Brook and Rockwell Pond. There will also be little or no effect on the biological productivity of Leominster itself due to the project.

7.01 The long-term benefits on the human environment will be significant. The lack of flooding will encourage construction and improvements along the brook and in flood prone areas. Industries and homeowners will no longer face occasional nuisance flooding or rarer, more disastrous events. Without occasional flooding, human activities will probably encroach upon and disturb the brook. Increased development and prosperity could lead to a degradation in brook quality, but responsible development should prevent this and can even enhance brook quality. With tree plantings and other improvements such as the town's reverting to a trout habitat.

8.00 ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS  
OF RESOURCES WHICH WOULD BE INVOLVED IN THE  
PROPOSED ACTION SHOULD IT BE IMPLEMENTED

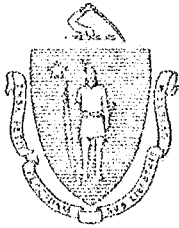
Irretrievable resources involved with this project include construction materials, capital, labor and fuel. Approximately 750 tons of steel and 9,000 cubic yards of concrete will be used to build the diversion. Thousands of cubic yards of pulverized rock will be created by this project and be made available for other construction.



## 9.00 COORDINATION AND COMMENT AND RESPONSE

A number of meetings have been held with State and local people concerning this project (see Correspondence in Appendix). In general there is no opposition to it. To receive further views on this project, a public meeting was held in the Leominster City Hall on 27 January 1976. Here also, the public saw few problems with the proposal. As the need arises, more meetings will be held to inform all interested parties as to the progress of the project.

## APPENDIX A



*The Commonwealth of Massachusetts*  
*Office of the Secretary*

*Massachusetts Historical Commission*

Paul Guzzi

294 Washington Street

~~XXXXXXXXXXXX~~

*Boston, Massachusetts 02108*

*Secretary of the Commonwealth*

727-8470

3 November 1975

Mr. Joseph L. Ignazio  
Chief, Planning Division  
Department of the Army  
New England Division, Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Re: Flood Control Project, City of Leominster

Dear Mr. Ignazio:

The Massachusetts Historical Commission concurs with the above project.

After reviewing our files, we can find within the project boundaries as submitted to us, no properties listed nor, to the best of our knowledge, eligible for listing in the National Register of Historic Places.

However, there are several monuments listed by the City of Leominster in the Inventory of Historic Places, within the impact area of the tunnel. No. 906 near the corner of Merriam Avenue and Main Street is a police marker erected in 1959. Nos. 910, 914, and 915 are located near the seismic investigations S-1 and S-3. No. 910 is the Oliver Carter Monument, 1906, Summer Street at Main Street in Carter Park. No. 914 is the Veteran of Foreign War Cannon at Main and Summer Street on the Common. No. 915 is the Willard Memorial Fountain dedicated in 1903 by the Women's Christian Temperance Union at Main and Summer Street on the Common. We suggest that you contact Mrs. Evelyn B. Hachey, Chairwoman, Leominster Historical Commission, 56 Manchester Street, 01453, concerning the effects on these monuments.

We also suggest that you contact the State Archeologist, Dr. Maurice Robbins, Bronson Museum, 8 North Main Street, Attleboro, 02703, for any identification of archeological sites within the project impact area.

Sincerely yours,

*Elizabeth Reed Amadon*

Elizabeth Reed Amadon  
Executive Director

Massachusetts Historical Commission  
ERA/PJT/pj  
cc: Leominster Historical Commission

NOTES REFERENCE TO: Leominster - Monoosnock Brook Field Survey

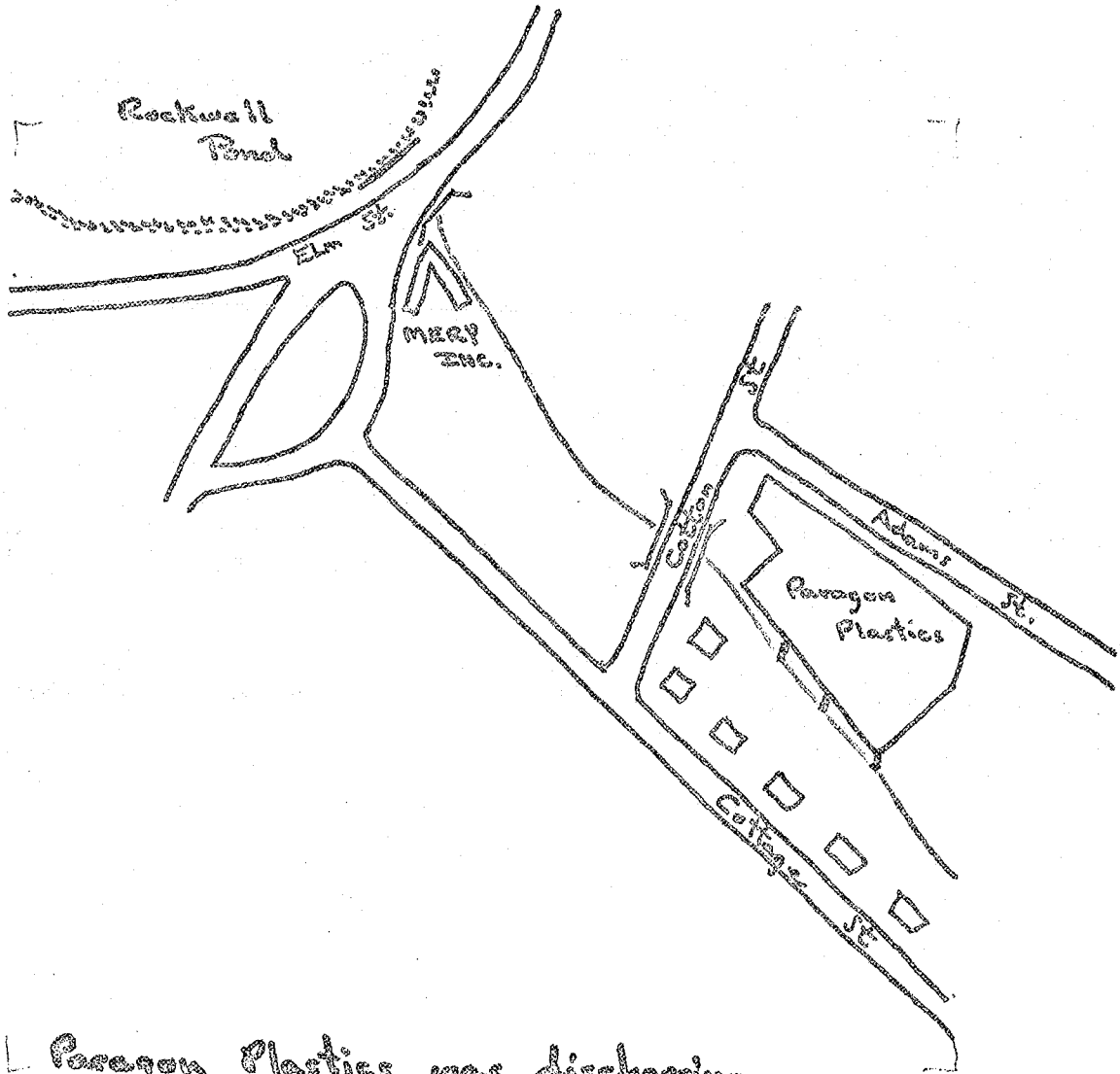
By: Stephen E. Poole

Date: October 4, 1971

On the above date, the writer conducted a survey of Monoosnock Brook, in the City of Leominster, by physically walking the brook bed from its confluence with the Nashua River to the dam at Rockwell Pond. The condition of the brook throughout this stretch can only be described as poor. The bottom is overgrown with algae and strewn with trash. The water is turbid, with a good deal of floating matter and some oil.

Many discharges were noted during this survey, both of industrial and sanitary wastes. The brook as it overflows the Rockwell Pond Dam seemed clear and of a high quality. The change took place almost immediately. Industrial discharges added color and floating matter to the flow. As the brook emerges on the downstream side of Leominster center, oil is discharged in a small quantity, but is collecting behind a dam causing an unsightly mess. As the brook flows from the center to the Nashua, it is subject to a discharge of raw sewage at one point. This discharge is near a populated area and could be a health hazard.

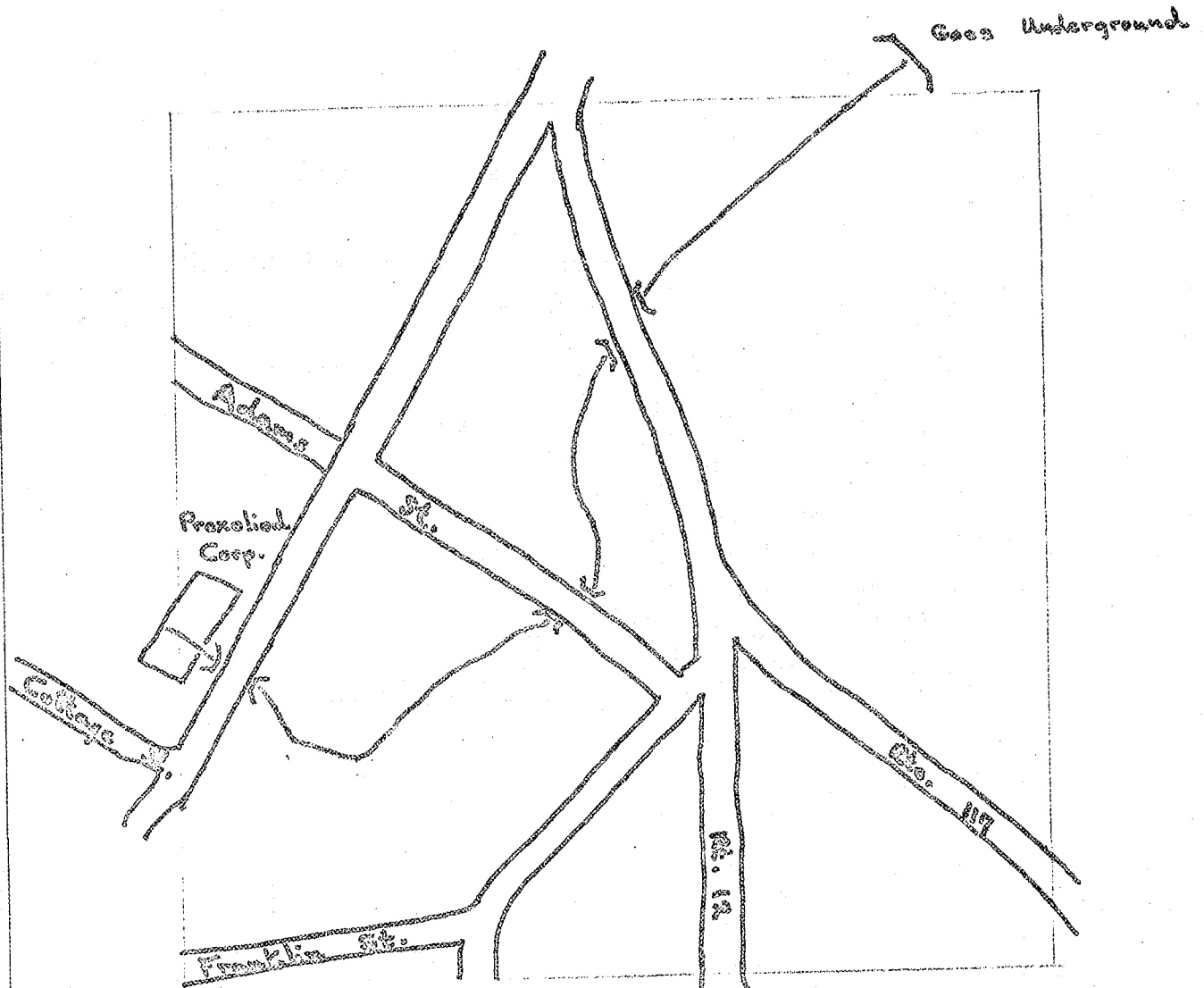
Sketches of the different sections of the brook locating the discharges are appended. All discharges should be checked with the Division of Water Pollution Control.



Paragon Plastics was discharging a murky waste with a high degree of floating matter

"LEOMINSTER"  
MONCOSNOC BROOK

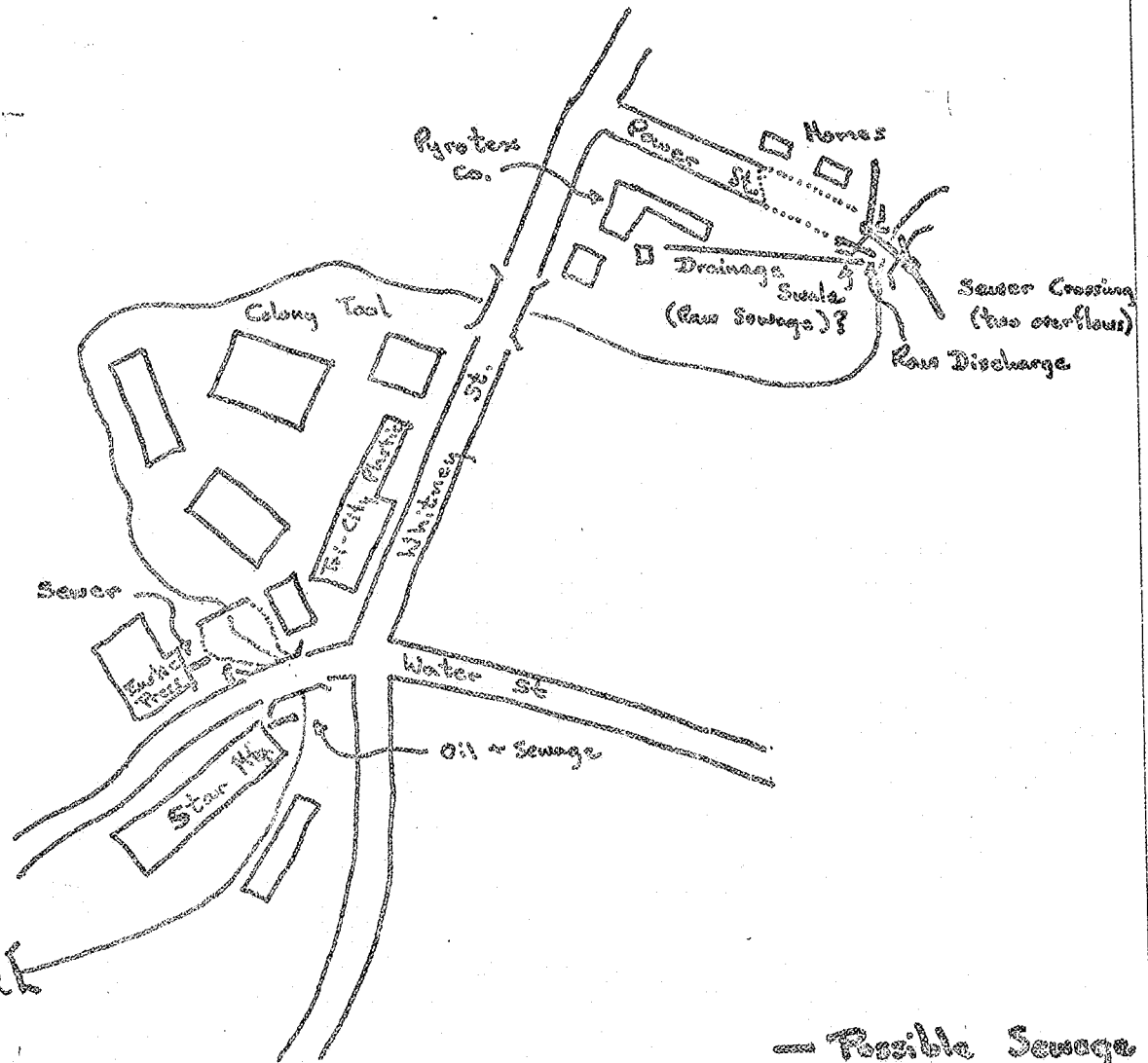
②



A-4

# Monocres. Brook

5



— Possible Sewage  
Sources & other  
Pollution

REC'D  
EP 14 1972  
VERS

Lab. LAWRENCE MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH LEOMINSTER  
WASTE ANALYSIS (mg. per liter) (City or Town)  
DIVISION OF WATER POLLUTION CONTROL

Source A MONOOSNOC BROOK - PHILLIPS LAKE OUTLET

Source B

Source C

Source D

Source E

Source F

	A	B	C	D	E	F
Sample No.	R55687					
Date of Collection	3/23/72					
Type Sample	GRAB					
Time of Collection	11:00					
Collector	POOLE					
Date Received	9/5/72					
Temperature						
COD						
BOD	0.8					
Suspended Total Solids - Loss	1.0					
pH	6.9					
Alkalinity - phth Total	6.0					
Coliform MPN						
Total Solids	45.					
Loss on Ignition						
Dissolved Oxygen						
Relative Stability						
Nitrite - Nitrogen						
Nitrate - Nitrogen						
TOTAL COLIFORM	210					
FECAL COLIFORM	36					

Remarks:



Lab. LAWRENCE

OCT 27 1971

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

LEOMINSTER

WASTE ANALYSIS (mg. per liter)

(City or Town)

Division of Water Pollution Control

Source A STORM DRAIN - Williams St. - Monocasset BrookSource B PYROTEX Co. Drainage Ditch

Source C

Source D

Source E

Source F

	A	B	C	D	E	F
Sample No.	R53795	796				
Date of Collection	10-8-71					
Type Sample	GRAB					
Time of Collection	1 p.m.					
Collector	Poole					
Date Received	10-8-71					
Temperature						
COD		15				
BOD	15	5				
Suspended Total Solids - Loss		14				
pH	6.4	5.9				
Alkalinity - phth Total	20	48				
Coliform MPN						
Total Solids		96				
Loss on Ignition						
Dissolved Oxygen						
Relative Stability						
Nitrite - Nitrogen						
Nitrate - Nitrogen						

Remarks:

Very small sample volumes....

NEDED-W (30 June 1976)

SUBJECT: Studies for Local Flood Protection, Monoosnoc Brook, Leominster,  
Massachusetts

TO: Chief, Planning Div

FROM: Acting Chief,  
Engineering Div

DATE: 14 September 1976 CMT 2  
Mr. Cassidy/jdt/543

Inclosed is the water quality storage study for the proposed Monoosnoc Brook diversion tunnel. Based upon these studies, the water stored between flood events is not anticipated to be depleted of dissolved oxygen, but instead, will maintain a minimum value of approximately 7 mg/l. These findings are based on the limited data and laboratory analyses described herein and it is recommended that additional water quality investigations be performed during the design phase of this project.



SARANDIS

Incl  
as

cy furn:  
Mr. Cassidy  
Engrg Div Files

## WATER QUALITY/STORAGE STUDY

### MONOOSNOC BROOK LOCAL FLOOD PROTECTION MONOOSNOC BROOK DIVERSION TUNNEL

Water stored in the proposed Monoosnoc Brook Diversion Tunnel between flooding events is not anticipated to be depleted of dissolved oxygen. Based upon preliminary studies concerning the effects of water storage on dissolved oxygen concentrations, it is expected that a minimal value of approximately 7 mg/l will always remain in the tunnel. A more detailed sampling program will be required during the design phase to verify these results.

The estimated minimal storage value is due to the good quality of the water in Monoosnoc Brook. There are six water supply impoundments in the 10.4 square mile drainage area contributing to the outlet of Rockwell Pond, the intake site of the proposed diversion. These include Notown, Haynes, Morse and Distributing Reservoirs, and Goodfellow and Sumond Ponds. All of these impoundments and their tributaries are presently classified by Massachusetts as Class A waters. Under the standards for the classification system, the dissolved oxygen percent saturation is always equal to or greater than 75 percent for at least 16 hours per 24-hour period. The oxygen concentration in the water supply associated tributaries are always equal to or greater than 5 mg/l. Total coliform bacteria per 100 ml do not exceed an average value of 50 counts during any monthly sampling period. Color, turbidity, pH, odor and taste are all of natural origin.

The main stem of Monoosnoc Brook is classified as B water. Under this classification dissolved oxygen in the stream should be at levels above 75 percent of saturation during at least 16 hours of any 24-hour period, and at a concentration of not less than 5 mg/l at any time. Total coliform bacteria counts should not exceed an average value of 1,000/100 ml nor more than 1,000 in 20 percent of the samples. Color, turbidity, taste, odor and chemical constituents should be present in concentrations such that no impairment of Class B uses will occur and none which are harmful to humans and aquatic life.

The water quality study concerning the effects of storage on dissolved oxygen concentrations is based upon results from Rockwell Pond water collected on 18 May 1976. Table 1 lists the values of the parameters measured and the calculated ultimate biochemical oxygen demand (BOD).

In order to determine the effects of storage on dissolved oxygen concentrations in the proposed tunnel, four assumptions were made:

(1) It was assumed that the data from the later phase of the storage experiment was incorrect because the dissolved oxygen values increased after 4 June 1976 (Table 2). The manufacturer of the dissolved oxygen meter was contacted to discuss the possibility that oxygen was introduced into the test bottles when measurements were being obtained. The manufacturer indicated that only an insignificant amount of oxygen would be normally introduced. However, similar studies performed by Dr. F. DiGiano of the University of Massachusetts for the Corps proposed Beaver Brook Lake Project also experienced increasing dissolved oxygen concentrations in his storage studies. He attributed the increase to dissolved oxygen introduction during sampling even though precautions were taken during the experiment to exclude this occurrence.

(2) Based upon engineering judgment, it was assumed that the portion of the data reflecting oxygen consumption during the initial phase of the study is representative of the type of consumption for the entire test period.

(3) It was also assumed that the water stored in the Monoosnoc Brook diversion tunnel between flood events will have a low BOD because it is water retained during the recessional side of the hydrograph. Studies done elsewhere disclose that organic matter and other pollutants are usually washed from the watershed during the first hours of a storm event. The low BOD during sample collection is considered representative of values in the tunnel after diversion has ceased.

(4) An asymptotic decay curve was assumed because bacteria in the stored water will consume oxygen and organic matter. When all the nutrients are utilized, dissolved oxygen depletion will stop. Since the ultimate BOD is low, not all the oxygen will be consumed. The calculated lower limit of dissolved oxygen ( $k$ ) can be considered the approachable asymptotic value. Therefore, the equation for the dissolved oxygen depletion will take the generalized form:

$$Y_c = k + ab^x$$

Based upon these assumptions, the following equation for dissolved oxygen prediction in the proposed tunnel is:

$$C_{DO} = 6.58 + 3.8 (0.79)^x$$

$C_{DO}$  = dissolved oxygen concentration in mg/l

$x$  = days of storage

According to Figure 1, it will take approximately 22 days to reach the minimal dissolved oxygen concentration of 6.58 mg/l in the tunnel.

The maximum dissolved oxygen concentration in the test bottle was 10.0 mg/l while the ultimate BOD concentration of the water was 2.6 mg/l, leaving 7.4 mg/l. The difference between 7.4 mg/l and the minimum value of approximately 6.6 mg/l is the amount of oxygen that will react with ferric ions in the water to produce a ferric hydroxide precipitate.

TABLE 1

MONOOSNOC BROOK DIVERSION PROJECT  
LEOMINSTER, MASSACHUSETTSWATER QUALITY  
ROCKWELL POND

<u>Parameter</u>	<u>Value</u>
Date	18 May 1976
Time	0935
Air Temperature	18.8° C
Water Temperature	20.0° C
Dissolved Oxygen	8.5 mg/l
pH	6.4
Specific Electrical Conductance	13 umhos
Ultimate BOD	2.6 mg/l

TABLE 2

MONOOSNOC BROOK DIVERSION PROJECT  
LEOMINSTER, MASSACHUSETTSDISSOLVED OXYGEN/STORAGE PERIODLABORATORY STUDY\*

<u>Date</u> <u>(1976)</u>	<u>Dissolved Oxygen</u> <u>(mg/l)</u>
18 May	9.3
20 May	9.3
24 May	10.0
26 May	10.0
28 May	9.4
1 Jun	8.0
2 Jun	7.9
4 Jun	7.9
7 Jun	8.4
9 Jun	9.0
11 Jun	8.8
14 Jun	9.6
16 Jun	9.2
21 Jun	9.6

\*Test conditions were performed at the expected  
tunnel temperature range of 50-50°F.  
-55

8-14

# MONOCISNOG BROOK DIVERSION TUNNEL

Leominster, Mass.

## DISSOLVED OXYGEN DEPLETION CURVE FOR WATER STORED BETWEEN DISCHARGE EVENTS

DISSOLVED OXYGEN  
(mg/l)

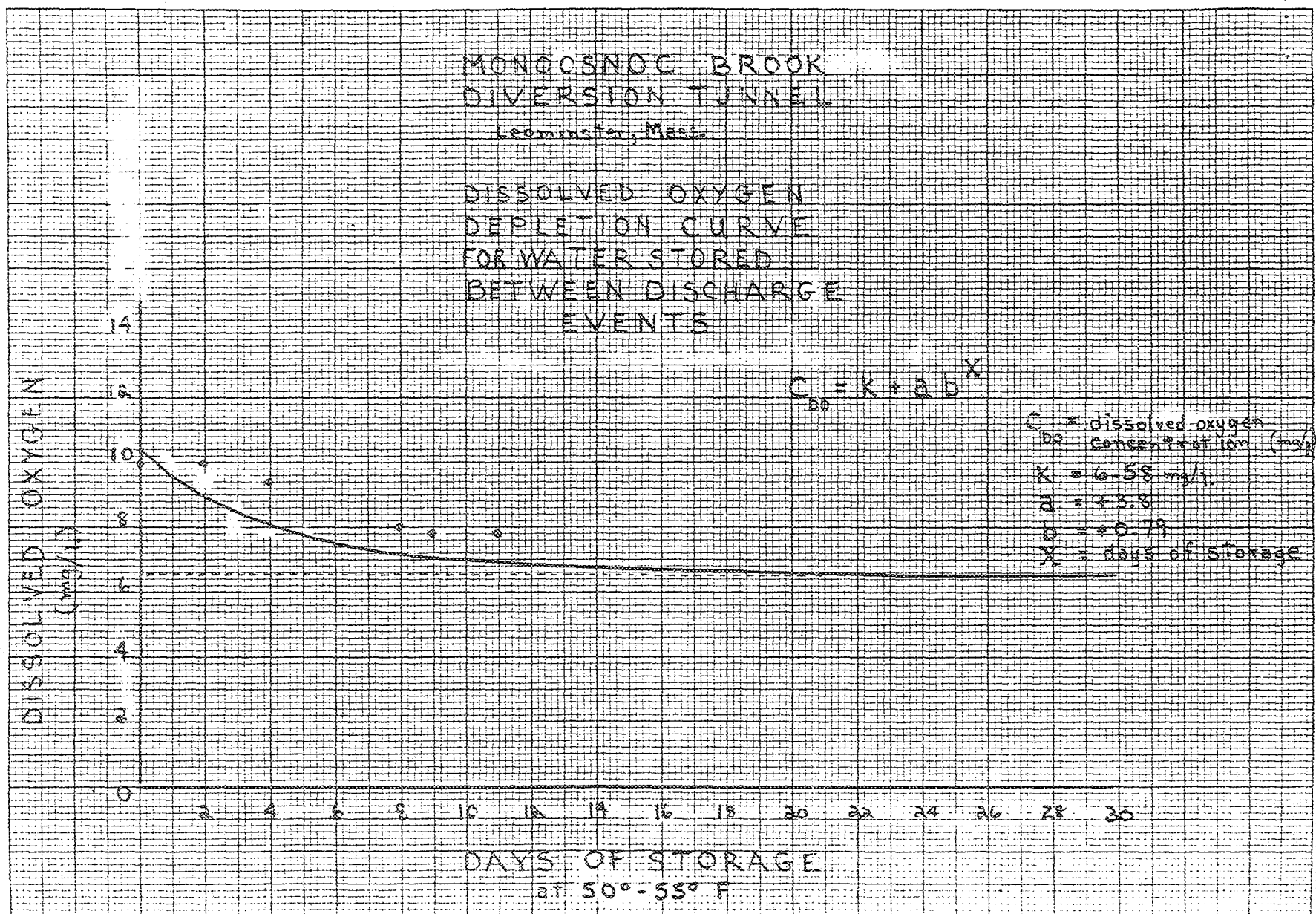
14  
12  
10  
8  
6  
4  
2  
0

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

DAYS OF STORAGE  
at 50°-55° F

$$C_{DO} = K + a b^X$$

$C_{DO}$  = dissolved oxygen  
concentration (mg/l)  
 $K$  = 6.58 mg/l  
 $a$  = +3.8  
 $b$  = +0.79  
 $X$  = days of storage





*C. Curullo*

NRDPL-P

13 January 1977

(SEE ATTACHED LISTING FOR  
ADDITIONAL ADDRESSEES)

Supervisor  
Concord Area Office  
Bureau of Sport Fisheries & Wildlife  
U.S. Fish & Wildlife Service  
55 Pleasant Street  
Concord, N.H. 03301

Dear Sir:

Project formulation for a plan of local flood protection for the central business district of Leominster, Massachusetts, is nearing completion. A feasibility report will be forwarded to the Chief of Engineers, recommending construction of a twelve-foot diameter diversion tunnel to by-pass Monoosnoc Brook flood flows from Rockwell Pond to a point below Water Street. Other appurtenant construction features would include regrading of flood prone property at the Pyrofax Corporation and relocations of utility pipes that cross the brook at the end of Williams Street and also under the Whitney Street Bridge.

Total project costs are currently estimated at \$7,580,000 including a Federal cost of \$6,980,000 and a non-Federal cost of \$600,000 for lands, damages and utility relocations. During our plan formulation process, several alternative plans of protection, both structural and nonstructural were given consideration. However, to provide protection against a flood greater than experienced, the proposed plan was selected as the most feasible and economically justified project for the city of Leominster.

Two preliminary plans, entitled (1) Basin Map and (2) General Plan and Profile for the proposed diversion tunnel, are inclosed for your information. A preliminary draft Environmental Impact Statement will be provided by separate letter at a latter date for your review and comments. The initial public meeting, which discussed the various studied alternatives, was held on 27 January 1976 while preliminary assurances of local cooperation were obtained from the city of Leominster on 1 April 1976.

Mr. Swaine/paw/532  
13 January 1977

NEDPT-P  
Supervisor, Concord Area Office

It would be appreciated if your comments concerning the proposed project could be returned within 30 days to be incorporated in our planning schedule toward early report completion.

Sincerely yours,

JOSEPH L. IGNAZIO  
Chief, Planning Division

- 2 Incls  
1. Basin Map  
2. General Plan and Profile

EF  
Mr. Ciriello ✓  
Planning Div Files  
Reading File

The Draft Environmental Impact Statement for the Leominster Local Protection Project required some minor editorial corrections; and in addition one figure and a coordination letter, which had been inadvertently excluded, were added to the Final Environmental Impact Statement.

Seventeen agencies or organizations commented on the Environmental Impact Statement. Seven of these stated that their concerns were adequately addressed. Ten others required further response from the Corps. The following are all comments and responses:

a. Executive Office of Environmental Affairs

Comment: "On page 2-4, the present channel capacity of the brook is given as 800 cfs. There is no indication of what the channel capacity was at the time of the 1936 flood. More to the point, there is no indication as to whether the 800 cfs capacity refers to the channel in its present debris-choked state, or in its proposed cleaned-out state. If the 800 cfs refers to the former condition, how would a brook cleaning affect the channel capacity?"

Response: The information on channel capacity is found on pages 1-1 and 1-2, and not on page 2-4. The present safe channel capacity is 800 cfs as the table on page 1-2 reveals; therefore, cleaning the channel would increase its capacity. However, construction of a bypass tunnel would preclude the need for such work. The city of Leominster, as part of the local co-operation agreement, would be required to maintain the capacity of 600 to 800 cfs in the existing channel.

Comment: "It is stated on page 4-1 that up to 75% of the labor force employed on the project might be drawn from the local area. Given that most of the project will involve shaft and tunnel construction requiring relatively specialized skills, is this a reasonable figure?"

Response: The 75% figure was derived from similar projects constructed by the Corps, and the Corps believes this is a fairly accurate estimate. However, if the State of Massachusetts can supply data with a different percentage, the Corps would consider incorporating the information in the EIS.

Comment: "The EIS should describe in more detail the plans for construction debris disposal (page 4-2). It should discuss how and where both cleared debris and excavated rock will be disposed of in an environmentally sensitive manner."

Response: Presently, the Corps is unable to specify exactly how or where the debris and excavated rock will be disposed. But, a standard clause placed in Corps specifications reads: "The Contractor and his subcontractors shall comply with all applicable Federal, State and local and law regulations concerning environmental pollution control and abatement." Massachusetts has enacted many laws concerning sensitive environmental resources. When disposing of the material produced by the tunneling work and where disposal may impinge upon any of these sensitive resources, the contractor will have to comply with the substantive provisions of the State and local governments' regulatory plans. Full time inspection of the Contractor's disposal methods would be accomplished by Corps representatives.

Comment: "The discussion of the DO characteristics of water trapped in the tunnel between diversions (page 4-2) is cursory and very unsatisfactory. Aside from its apparent experimental errors, the approach described in the appendix is oversimplified and does not consider such conditions as the high BOD and COD of urban runoff; the oxygen demand decaying organic matter, such as leaves, which may be left in the tunnel between storms; and a series of storms large enough to produce flow into the tunnel, but not large enough to flush out the tunnel completely. Many towns in Massachusetts have experienced pollution problems from unmaintained catch basins, and the proposed tunnel represents the same problem magnified enormously. Much more thought and study should be given to the biological and chemical impacts of the tunnel on downstream waters."

Comment: "The EIS should describe in more detail the plans for construction debris disposal (page 4-2). It should discuss how and where both cleared debris and excavated rock will be disposed of in an environmentally sensitive manner."

Response: Presently, the Corps is unable to specify exactly how or where the debris and excavated rock will be disposed. But, a standard clause placed in Corps specifications reads: "The Contractor and his subcontractors shall comply with all applicable Federal, State and local and law regulations concerning environmental pollution control and abatement." Massachusetts has enacted many laws concerning sensitive environmental resources. When disposing of the material produced by the tunneling work and where disposal may impinge upon any of these sensitive resources, the contractor will have to comply with the substantive provisions of the State and local governments' regulatory plans. Full time inspection of the Contractor's disposal methods would be accomplished by Corps representatives.

Comment: "The discussion of the DO characteristics of water trapped in the tunnel between diversions (page 4-2) is cursory and very unsatisfactory. Aside from its apparent experimental errors, the approach described in the appendix is oversimplified and does not consider such conditions as the high BOD and COD of urban runoff; the oxygen demand decaying organic matter, such as leaves, which may be left in the tunnel between storms; and a series of storms large enough to produce flow into the tunnel, but not large enough to flush out the tunnel completely. Many towns in Massachusetts have experienced pollution problems from unmaintained catch basins, and the proposed tunnel represents the same problem magnified enormously. Much more thought and study should be given to the biological and chemical impacts of the tunnel on downstream waters."

Response: The Corps appreciates the State's apprehension over the dissolved oxygen test. However, we still believe the results give a fairly good approximation of the conditions that might result from retaining water in the tunnel. To explain our position, it might be helpful to theoretically analyze how much organic matter would be required to completely denude the tunnel's water of dissolved oxygen, to determine the amount of material required to lower the dissolved oxygen to 6.6 mg/l, and to determine the amount of organic material that might realistically be expected to accumulate in the tunnel.

Between diversions, the tunnel will retain 360,000 cubic feet of water; this is equivalent to 10,162,800 liters of water. Assume that the dissolved oxygen content of the pond's waters is 8.5 mg/l (this is the initial amount found in our study), multiplying this figure by the number of liters, then the total milligrams of dissolved oxygen is 86,383,800. The ratio of oxygen consumed to organic matter is 1:88.\* That is, 1 milligram of oxygen can decompose 88 milligrams of organic matter. Then to determine the amount of organic matter necessary to completely consume the oxygen in the water multiply 86,383,800 by 88. The result is 7,601,774,400 mg; that is equivalent to 16,762 pounds. In other words, it would require over 8 tons of material to completely deplete the dissolved oxygen.

The suspended organic matter found in American lakes ranges from .23 to 12 mg/l with an average of 1.36 mg/l.\* If Rockwell Pond's waters are

\*S.I. Kuznetsov, The Microflora of Lakes and Geochemical Activity, pages 32 and 238, University of Texas Press, Austin and London, Originally published in 1970 by Nauka Publishing House, Teningrad Branch, Teningrad, USSR

on the high side, then 269 pounds of matter would go into the tunnel from the pond. If it is the average, then 30 pounds would enter the tunnel, and 5 pounds would enter for the low value. Considering it would require 3,688 pounds to lower the oxygen content to 6.6 mg/l, these are very small amounts. There would be an excess amount of oxygen present for additional organic matter to be broken down and for other chemical reactions requiring oxygen.

Furthermore, the dissolved oxygen found in the tunnel would be high since the water would be mixed with the atmosphere as it enters the tunnel; also the water remaining in the tunnel after flooding would be the cleanest since most materials would have been flushed from the system. For all of these reasons, the Corps believes there should not be a problem with this tunnel.

However, to further insure that the position presented is correct, a more detailed study will be conducted during the design phase, as is stated in the last sentence of the first paragraph of the study. Also, a low flow gate would be provided on the Rockwell Pond intake structure to allow for flushing of the tunnel if it becomes necessary.

#### Calculations

Liters in cubic foot 28.23

360,000 cubic feet of water in tunnel

Liters in tunnel 10,162,800

$8.5 \text{ mg/l} \times 10,162,800 = 86,383,800 \text{ mg/of DO}$

#### Ratio of consumption oxygen to organic matter 1:88

$86,383,800 \times 88 = 7,601,774,400 \text{ mg of organic matter}$

convert to grams 7,601,774.

to convert to lbs.  $0.002205 \times 7,601,774 = 16,762 = 8.38 \text{ tons}$



Organic matter intakes

<u>Range</u>	<u>Average</u>
0.23 to 12 mg/l	1.36 mg/l

High

.012 g/l X 10,162,800 = 121,954 gram organic in tunnel

0.002205 X 121,954 = 269 lb organic material in tunnel

Average

.00136 g/l X 10,162,800 = 13,821 gram

lbs. 0.002205 X 13,821 = 30.4 lbs.

Low

.00023 g/l X 10,162,800 = 2,337.4 grams

lbs. 0.00205 X 2,332 = 5.2 lbs.

Comment: "This office is expecting to review a plan for the proposed expansion of the Searstown shopping center in the near future; this plan includes the relocation and diking of the lower end of Monoosnoc Brook. Would this activity, in connection with the Corps' proposed project, lead to more serious downstream flooding problems than described on page 4-3?"

Response: The Corps does not have a copy of the proposed plans for expanding Searstown Shopping Center. When the State receives such plans, we would like to obtain a copy to determine if our project would increase the downstream flooding problem.

Comment: "Safety factors" are listed as a long-term impact on page 5-2. What kinds of safety precautions will be taken to prevent injuries related to the intake and discharge structures?"

Response: We refer you to page 1-3 of EIS and to the detailed plans of the project sent to your office. These sources show that the intake structure will be capped and the discharge structure will be fenced.

Comment: "According to the February 1977 Nashua River Watershed Association newsletter, there are firm plans for a city mini-park along Monoosnoc Brook. Any impacts the proposed project would have on this site should be described in the EIS."

Response: The city of Leominster is planning for a city mini-park along Monoosnoc Brook. Plans call for the cleaning of a portion of the brook in downtown Leominster and planting trees around a parking lot. The Corps' project should not conflict with the mini-park; this point was also confirmed by Mr. Bill Murrah of the Leominster Planning Board.

Comment: "The benefit/cost ratio of this project should be stated and explained in the EIS."

Response: To determine the benefit/cost ratio, the annual losses that would occur if the project is not constructed are compared against the annual costs.

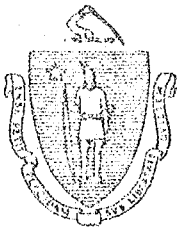
From a survey of the flood-prone property, it was estimated that the annual loss would be \$526,700. An additional \$76,000 was added to the above figure for area redevelopment benefits. Thus, the annual benefits are \$602,700.

Estimated total first costs are \$7,640,000. When amortized over a 100 years at 6-5/8% interest, this yields an annual cost of \$508,600. (This includes approximately \$1,700 for annual operation and maintenance.) Comparing annual costs \$508,600 and annual benefits \$602,700 gives a benefit to cost ratio of 1.2 to 1.0.

## 9.00 COORDINATION AND COMMENT AND RESPONSE

A number of meetings have been held with State and local people concerning this project (see Correspondence in Appendix). In general there is no opposition to it. To receive further views on this project, a public meeting was held in the Leominster City Hall on 27 January 1976. Here also, the public saw few problems with the proposal. As the need arises, more meetings will be held to inform all interested parties as to the progress of the project.

## APPENDIX A



# *The Commonwealth of Massachusetts*

## *Office of the Secretary*

*Massachusetts Historical Commission*

294 Washington Street

~~XXXXXX~~

Boston, Massachusetts 02108

Paul Guzzi

*Secretary of the Commonwealth*

727-8470

3 November 1975

Mr. Joseph L. Ignazio  
Chief, Planning Division  
Department of the Army  
New England Division, Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Re: Flood Control Project, City of Leominster

Dear Mr. Ignazio:

The Massachusetts Historical Commission concurs with the above project.

After reviewing our files, we can find within the project boundaries as submitted to us, no properties listed nor, to the best of our knowledge, eligible for listing in the National Register of Historic Places.

However, there are several monuments listed by the City of Leominster in the Inventory of Historic Places, within the impact area of the tunnel. No. 906 near the corner of Merriam Avenue and Main Street is a police marker erected in 1959. Nos. 910, 914, and 915 are located near the seismic investigations S-1 and S-3. No. 910 is the Oliver Carter Monument, 1906, Summer Street at Main Street in Carter Park. No. 914 is the Veteran of Foreign War Cannon at Main and Summer Street on the Common. No. 915 is the Willard Memorial Fountain dedicated in 1903 by the Women's Christian Temperance Union at Main and Summer Street on the Common. We suggest that you contact Mrs. Evelyn B. Hachey, Chairwoman, Leominster Historical Commission, 56 Manchester Street, 01453, concerning the effects on these monuments.

We also suggest that you contact the State Archeologist, Dr. Maurice Robbins, Bronson Museum, 8 North Main Street, Attleboro, 02703, for any identification of archeological sites within the project impact area.

Sincerely yours,

*Elizabeth Reed Amadon*

Elizabeth Reed Amadon  
Executive Director

Massachusetts Historical Commission  
ERA/PJJ/pj  
cc: Leominster Historical Commission

Comment: "Finally, a minor point: carbon monoxide is not the same as TSP (total suspended particulates ) as implied on page 2-3."

Response: TSP should have commas around it and not parentheses. The error has been corrected.

b. The Commonwealth of Massachusetts - Mass. Historical Commission

Comment: "Copies of the Cultural Resource Reconnaissance Study were sent to the Historical Commission, Massachusetts State Archaeologist, National Park Service - North Atlantic Region, National Park Service-Interagency Archaeological Services, and the Advisory Council on Historic Preservation."

Response: Each of these agencies acknowledged receipt of the report and expressed concurrence with its findings. The Massachusetts Historical Commission, State Archaeologist, and National Park Service-North Atlantic Region specifically concurred with the recommendation for further survey in two areas of the project. Should further studies be authorized by Congress, these recommendations will be incorporated in a scope of services for a Cultural Resources Survey of these areas.

c. United States Environmental Protection Agency

Comment: "EPA's only concern was over the water held in the tunnel between storms."

Response: Please read the Corps' response number 4 to the Massachusetts Executive Office of Environmental Affairs.

d. United States Department of Commerce

Comment: " There is little discussion of costs, compared with benefits, of the proposed project. Although there is reference in Sections 4.03,

4.04, and 4.05 to a 1974 study which determined the costs of flood damage, the only discussion of costs of tunnel construction occurs in Sections 6.06, 6.07; these Sections, however, are quite vague and give no specific indications of comparative costs of alternative solutions. In Section 6.07, it is stated without justification that the proposed tunnel "is a sound engineering solution, and economically justified." We recommend a more detailed development of costs and benefits."

Response: Please read the Corps response to the Commonwealth of Massachusetts Executive Office of Environmental Affairs and to the League of Women Voters of Leominster (8 and 6 respectively) on this matter.

Comment: "The flood prevention program is based on three recorded floods (1936, 1938 and 1955). There is insufficient analysis of annual rainfall patterns and of the expected magnitude of future major floods."

Response: See the following response.

Comment: "It is stated in Section 7.01 that 'The lack of flooding will encourage construction and improvements along the brook and in flood prone areas.' But, this seems to be in conflict with the statement in Section 4.16, concerning the Searstown Shopping Center, built on an existing flood plain, that 'the tunnel might increase the flooding at Searstown Shopping Center. Since the shopping center is situated on the flood plain between the North Nashua River and the Monoosnoc Brook, there seemed to be some justification for this concern.' Section 4.17, which apparently is intended to answer the question that had been raised in 4.16, is inadequate for that purpose, and should be considerably expanded."

Response: According to the Council on Environmental Quality\* the purpose of an Environmental Impact Statement is to present "information succinctly in a form easily understood, both by members of the public and by public decision-makers, giving attention to the substance of the information conveyed rather than to the particular form, or length, or detail of the statement." And just lately, the Council distributed a memo stating that many EIS's have become voluminous in an attempt to address all facets of a proposal, whether they are significant or not.\*\*

The Corps tried to present the pertinent data in a comprehensible style. In doing this, the presentation of some technical data was sacrificed. However, the Corps will supply the Commerce Department a Survey Report which has the requested data for comments 2 and 3, but will not incorporate this material in the EIS since we believe it will unduly clutter the document.

Comment: "It is acknowledged in Section 4.11, concerning the fate of water trapped in the funnel for long periods of time, and the possibility that oxygen levels might become unacceptably low, that 'the tests were only conducted for a short period and there may be some doubt as to the reliability of the reading in the later part of the experiment....' In some years, the water could remain in the tunnel for many months. The consequences of this possibility should be explored further."

Response: Please read the Corps' response number 4 to the Commonwealth of Massachusetts Office of Environmental Affairs.

\*"Federal Register," Vol. 38, No. 147, Aug 1, 1973 §1500.8 content of environmental statements; 1

\*\*Copy of memo in Appendix



e. United States Department of the Interior

Comment: "It would be useful if the statement would show the location of the wells used to supply the city in relation to the alignment of the tunnel. The aquifer(s) tapped by the wells should be indicated, especially if they penetrate bedrock. If the wells are in the vicinity of the tunnel site, evaluation of the potential for seepage from the tunnel, and/or perhaps the degree of treatment of the ground water would be appropriate."

Response: When the Corps first learned of the wells, there was concern that the tunnel might affect the wells' aquifers. However, when it was learned that the wells are in a different drainage system and that the Monoosnoc Brook is separate from the tunnel and the wells, it was decided that there would be little possibility of the tunnel affecting the aquifers. Figure 5A has been included in the EIS to display this point.

f. United States Department of the Interior - Bureau of Mines

Comment: "Construction of a tunnel of the dimensions proposed would produce about 20,000 cubic yards of excavated material taking into account the swell factor. About 10 percent of this material could be used for grading the Monoosnoc stream channel as part of the overall protection project. Plans for disposal of the rest of the material is left up to the Contractor (Page 4-2).

Inadequate consideration is given to the disposal of this quantity of material and how it might effect local crushed stone producers. The proposed action will have no impact on other mineral resources."

Response: P.J. Keating Company in Lunenburg, Massachusetts has the only active quarry in the vicinity of Leominster. In a telephone conversation on May 5 1977 with Mr. Warren Keating, he stated that the selling of excavated

stone from the tunnel could have a minor or major impact on the company, depending upon the amount of processing the stone went through. If the stone was substantially processed, then it might be worth \$100,000 and this would significantly impact the company. On the other hand, if the stone was just used for fill, then it would only be worth \$20,000 and this would have an insignificant impact on the company.

g. Regional Environmental Council, Inc.

Comment: "1:13 - No mention made of how debris, pollutants, etc., will be restricted from entering the pipe system, and who will be responsible for its maintenance."

Response: The cap over the intake structure and the grating around the cap will prevent most larger debris from entering the tunnel. (This information can be found on page 1-3 and on Figure 4 of the EIS.) However, some debris and dissolved materials will enter the tunnel, but the force of the water should drive most of it out. Thus, the water remaining in the tunnel after floodwaters have subsided should be fairly free of these materials.

The city of Leominster will be responsible for maintaining the tunnel, and the Corps will inspect the tunnel twice a year to insure that the tunnel is properly maintained.

Comment: "1:14 - Two city sewer lines must be relocated as part of the overall project. The line under the Whitney Street bridge presents problems: Where is it to be relocated under the brook?, and will a cofferdam be necessary?, and will measures be taken to prevent erosion and siltation? Also, approvals will be required for the Division Water Pollution Control and the Leominster Conservation Commission, as well as the Corps. Can we assume a suitable site for relocation is available?"

Response: The sewer line at Whitney Street would be relocated under the brook. Present plans do not call for a cofferdam. Although erosion and siltation would occur from construction activities, the Corps will endeavor

to hold the problem to a minimum. In an attempt to ensure this, the contract with the Contractor will require that State and Federal water quality criteria not be violated.

Comment: "2:07 - Geology is generally described as bedrock covered by sand. Figure 3 shows "assumed bedrock" which to us indicated somewhat limited core or bore tests were taken to locate this rock. To undertake such a large elaborate project based on assumptions seems somewhat curious. No data on core samples, locations, etc., were noted in the Statement."

Response: Two borings and seismic investigations were conducted. The borings were taken at the intake and the discharge structures. The seismic investigations were also near the discharge structure. Bedrock is very common in this area and our sampling confirmed this point. Also, the assumed bedrock designation only means that the Corps does not have complete information on the area; however, sufficient information exists for a reasonable prediction of the bedrock in the area. If necessary, further subsurface explorations could be made during Phase 2 studies or prior to preparation of plans and specifications.

Comment: "2:10/11 - Waters above Pond are Class A, below Class B, indicating nutrients are entering the water, as noted. We believe the leak in the sewer line should be repaired at once, and certainly before this project is undertaken."

Response: The Corps acknowledges the Regional Environmental Council, Inc. concern over the leak in the sewer line. However, the Corps does not have statutory authority over this problem - EPA and the State do, and both agencies are aware of the problem.

Comment: "2:24/25 - The Corps should insist that the illegal discharges into the brook be stopped prior to the start of the project. We believe also that the entire channel of the brook should be cleaned to remove the obstacles and debris, and the Corps should receive from commitments that the channel will be kept clean. All illegal discharges should be stopped by EPA."

Response: The Corps cannot insist that illegal discharges be stopped. This comes under the State and EPA jurisdiction. The city will be required to maintain the channel capacity at 800 cfs.

Photo - The photo is now identified on the "Photo Locations" figures.

Comment: "4:07-4:06 - Concerning the impact of dust, we believe the Corps has underrated the irritations of dust, and the effects of wind-blown dust, especially on those with respiratory problems. If the dust should blow towards the center of Leominster-already a severely impacted shopping area the dust would seriously impede and impact what is left of downtown shopping.

Concerning the construction of the tunnel, we assume that the method will be boring, not blasting, although that is not clearly explained. The site chosen for the disposal of the rock is of crucial importance. We assume the Corps and other agencies will carefully select a site with no potential for pollution of the area, and will supervise the disposal carefully."

Response: Areas where dust is a problem will be treated with calcium chloride or will be watered down. Corps projects must have Corps inspectors present to ensure that regulations and construction practices are followed. For these reasons, we doubt that there will be a significant problem.

Presently, it is not known whether boring, blasting or a combination of these will be used to construct the tunnel, but all construction will follow safe engineering practices -- economics usually dictates the method to be utilized.

As for the disposal site, please see the Corps response 3 to the Massachusetts Office of Environmental Affairs.

Comment: "4:08/11 - We have serious doubts about the adequacy, reliability and extent of the tests concerning the anoxia of the waters in the tunnel and their discharge into the brook. We believe much more testing is necessary to ensure that waters discharged into the brook will not impact wildlife in and around the brook. In other locations, we have seen the unfortunate results of discharges of anoxic water into natural streams."

Response: Please read the Corps' response to the Commonwealth of Massachusetts Office of Environmental Affairs comment number 4.

Comment: "4:12 - The filling of a section of Rockwell Pond could have serious impacts on plants and organisms which may or may not return after the fill is removed. Also, you do not mention possible changes in currents, nor is mention made of the time period this disruption would take place, a factor with serious implications."

Response: In artificially created ponds in the Midwest, it has been found that plants will become established within six months.\* Rockwell Pond should begin to recover within six months, if not sooner. The pond is a eutrophic body of water, and these are very productive ecosystems. Consequently, when the fill is removed, the plant community will quickly repopulate the area; and, of course, animal life would follow the plants into the area.

\*William H. Amos, The Life of the Pond, page 29, McGraw-Hill, Inc.  
copyright 1967

The current pattern should not be dramatically altered. Rockwell Pond is a sluggish body of water; this point can be validated by inspecting the two primary sources where water enters the pond. In both areas, there is a heavy build-up of fine sediments. If the currents were substantial, these sediments would be carried farther out into the pond before being released; but since the sediments are so close to the edge of the pond, this suggests that the currents are insignificant.

Comment: "4:17 ~ We note that the flooding of the shopping center would not be relieved by this project since the Nashua waters will be higher and will cause greater damage."

Response: The Corps project is not intended to relieve flooding at the shopping center.

Comment: "6:07 ~ No mention is made of who will be responsible for the continued maintenance of the tunnel. Will the Corps undertake that responsibility, or the city? In light of the past and present deplorable condition of the brook, we have little faith that the city can assume or wants this responsibility. The tunnel will not work effectively without proper maintenance."

Response: The city of Leominster will be responsible for maintaining the diversion tunnel. The Corps will inspect the system twice a year to ensure that the tunnel is properly maintained.

Comment: "7:01 ~ Construction of buildings on the flood plain is, in our opinion, not desirable in view of the history of destruction of buildings during floods in New England and elsewhere. Further, such construction may

be prohibited or restricted by the flood plain provisions of the City's Zoning Ordinance, and/or the Federal Flood Hazard Protection Act of 1973, now being implemented by HUD."

Response: The Corps agrees.

Comment: "9:00 - We strongly agree that public meetings to advise the status of the project should be scheduled, and we hereby request notice of any further meetings concerned with the Monoosnoc Brook project."

Response: The Corps will inform the Regional Environmental Council, Inc. of any future meetings on this project.

Comment: "General Comments: 1. Since this is an environmental report, we note the glaring omission of the Leominster Conservation Commission from your mailing list. We believe, for the mutual benefit of both bodies, that the Corps and the Commission should form a close working relationship. We are certain that the Commission wishes to keep informed on this important proposal. We also request the following to be placed on your mailing list:

League of Women Voters (Leominster) Land-Use-Water Quality  
Regional Environmental Council  
Nashua River Watershed Association  
Leominster Conservation Commission

2. We also note that this project falls into the category of projects which the Corps designs, engineers, proposes and then is requested to grant a "404" permit for its construction. This places the Corps in the position of judges, prosecutor, defense attorney and jury. A rather interesting conflict of interests which emphasizes the need for the public and concerned environmental groups to know what is going on and why."

Response: These organizations will be added to the mailing list for the Final EIS. The Corps conducts the same review for its own programs under



Section 404 as it does for other public and private agencies; furthermore, the Corps is required to meet the provisions of Federal and State laws and regulations.

h. Nashua River Watershed Association

Comment: "2.11 2-3 NRWA also understands that there is a leak in a sewer line under Rockwell Pond. The abundance of vegetation in the pond is indicative of nutrients being added to the water. This discharge should be corrected as soon as possible."

Response: United States EPA and the State of Massachusetts have responsibility for water quality. Both agencies are aware of the problem.

Comment: "1.12 1-3 Are no cleanout traps to be constructed? How would sediment or debris accidentally entering the tunnel be removed?"

Response: Cleanout traps would not be constructed because the tunnel is large enough to allow for easy entry after it has been drained, if necessary. Larger debris cannot enter the tunnel because of collectors at the intake structure.

Comment: "1.13(e) 1-4 How will pollutants be kept out of this catch basin and pipe?"

Response: The amount of pollutants entering the watershed should be slight since the area above Rockwell Pond is primarily an undeveloped watershed. And as such, the waters should remain in class "A" or "B".

Comment: "1.13(e) 1-4 The low area, next to the Pyrotex Corporation building, which is to be drained by a catch basin is currently cluttered with debris and plastic waste materials which are lying in a mucky depression of entrapped rain, snow-melt waters, and liquid waste. If the area is to be drained into Monoosnoc Brook, a firm agreement should be reached with the Pyrotex Corporation so that the area can be kept clean to allow for the growth of vegetation and to ensure that drainage water from this area will always be pollution free. The area should also be re-seeded as soon as possible to minimize runoff and to encourage the return of birds and mammals to the area."

Response: Filling and seeding of the area would preclude general deposition of trash. Such deposition would have to be regulated by the city of Leominster.

Comment: "1.14 1-4 There is no statement that the city will clean the brook of trash and debris. As indicated in 2.21, Appendix A (Steve Poole Memo), and NRWA observations, this is an aesthetic and hydraulic problem."

Response: It will be part of the formal local cooperation assurances that the city maintain the existing channel to pass a discharge of 600 cfs during the Standard Project Flood. This maintenance would include removal of trash

and debris. These regulations are monitored by the Corps during semi-annual inspections.

Comment: "2.24 2.25 2-5 If the existing channel is to be cleaned and modified, EPA should make certain that all discharges (principally those of Paragon Plastics) which might be harmful to human or aquatic life are discontinued before any construction begins."

Response: The Corps does not have statutory authority in this matter. The discharges come under the Federal Water Pollution Control Act for which EPA has authority.

Comment: "We are concerned, from an aesthetic point of view, that the proposed modifications of the stream channel and the grading of the 3 acres be maintained after the construction period. The channel is presently an eyesore, with all kinds of waste and debris cluttering it. After it is improved, debris and pollution, both industrial and sanitary, should be kept out of the brook."

Response: The Corps would inspect those aspects of the project for which we are responsible to ensure that everything is working as designed. Pollution and debris clearance are other agencies responsibilities, and the Corps can not assume authority in this matter.

Comment: "2.28 2-5 Our concern here is that the outlet site not interfere with animal habitat in the immediate area. Proper landscaping after construction should be sufficient."

Response: The Corps' present plan would have the area around the outlet structure landscaped.

Comment: "4.07 4-2 NRWA shares the Corps of Engineers concern for finding an environmentally acceptable site for the disposal of excavation materials and believes that close supervision by the Corps is necessary to ensure the finding of an acceptable site."

Response: The Corps would oversee the disposal of the excavated rock; in addition the State and/or local government would likely investigate disposal operations since they have enacted laws to protect environmentally sensitive areas.

Comment: "4.08 4-2 Not enough scientific data has been gathered concerning the possibility of retained water in the tunnel becoming anoxic between diversions. The possibility of releasing 360,000 cubic feet of anoxic water into the brook from the outlet site would have serious consequences on plants and organisms present in the channel."

Response: Please read the Corps response to Massachusetts Department of Environmental Affairs comment number 4 for our reply to this comment.

Comment: "4.12 4-3 The filling in of a portion of the pond may result in unknown adverse effects to the pond such as current changes. Have any studies been completed to determine how long it will take Rockwell Pond to revert to its former state after the fill is removed?"

Response: Please read the Corps response to the Regional Environmental Council Inc., comment number 8 for the reply to this comment.

Comment: "4.17 4-3 The statement that the tunnel project would not increase the possibility of flooding at the Searstown Plaza because the floodwaters of the Nashua would be considerably higher than those of the Monoosnoc,

causing more damage, is no solution to the problem of Searstown. It merely shifts the blame for Searstown flooding from the Monoosnoc to the Nashua."

Response: The diversion tunnel is not meant to be a solution for flooding at Searstown Shopping Center, but a solution for downtown Leominster.

And as stated on page 4-3, the possible increase in floodwater from Monoosnoc Brook would be only one to two inches, but the North Nashua's flooding would far over shadow this increase.

Comment: "7.01 7-1 The long term goal of the project is to protect downtown Leominster from the threat of flood. It follows, then, that the decreased threat of flood will encourage the development of the existing open flood plains. Much of this area is currently undeveloped. Tough flood plain management must be adopted by the city of Leominster to prevent encroachment by developers along the banks of the brook, if the tunnel project is authorized."

Response: If the local citizenry are of this mind, then they should, through their local city official, make sure that stringent flood plain management is adopted.

Comment: "9:00 9-1 A meeting should be held to inform all interested parties"

Response: The Corps will hold public meetings on this project as it progresses, and the Corps will endeavor to insure that those groups interested in this project will be kept informed.

i. The Wetlands Project

Comment: In Figure 3, the geology appears not to have been explored thoroughly: we find the legend "assumed bedrock" which can only mean that no one is completely certain of the underlying rock structure. (If this is true, how can accurate cost estimates for the boring of the pipeline be made)?

Response: Two boring and seismic investigations were conducted. The borings were taken near the intake and the discharge structures. The seismic investigations were also near the discharge structure. It is not unusual to conduct only a limited investigation - bedrock is very common in this area and our sampling confirmed this point. Also, the assumed bedrock designation only means that the Corps does not have complete information on the area; however, there is sufficient data for making fairly accurate predictions. Cost limitations for this study phase preclude were extensive foundation explorations. If considered necessary for final design cost estimating, further geological investigations will be made.

Comment: "The responsibility of cleaning and maintaining the pipe system has not been taken by either the Corps or the city, yet the system cannot function properly without this maintenance."

Response: The city will be responsible for maintaining the tunnel, and periodic flushing should remove most debris that passes through the trash-racks at the intake structure.

Comment: "Testing for the anoxia of the waters does not answer fully questions of the impact of the discharge water on the brook. The testing simply is not adequate."

Response: Please read the Corps response number 4 to the Commonwealth of Massachusetts Executive Office of Environmental Affairs on this matter.

The Corps is not advocating any construction in the flood plain or wetlands; the State and local authorities have jurisdiction over this matter. As for the impact on vegetation and wildlife, there will be a transition to an upland habitat, much like those species presently found in the hills surrounding the city.

As stated in the first paragraph, last sentence, on page 1-1 of the EIS, the purpose of the project is to decrease flooding in downstream Leominster; not at the shopping center. The information requested can be found in the Corps' Feasibility Report, which will be supplied to the local library.

j. League of Women Voters of Leominster

Comment: "1.12-1.13 p. 1-3 Shouldn't there be cleanout traps? How will sediment or debris accidentally entering the tunnel be removed? Where is the provision for dewatering the tunnel either on a regular basis or on the basis of D.O. content?"

Response: Cleanout traps are not necessary here since the tunnel is large enough to allow for entry if the tunnel has been pumped out. Please read response number 2 to the North Nashua River Watershed Association for further amplification on this matter.

Comment: "1.13-1.14 pp. 1-3, 1-4 It is indicated in Sec. 2.21 that trash and debris in the brook have caused localized flooding. Whose responsibility will cleanup on the brook be? The City's? The Corps?"

Response: The city will be required to clean up the brook if minimum flood discharges are impaired.

Comment: "2.11 p. 2-3 If there is a leak in a sewer line under Rockwell Pond, it should be corrected as soon as possible. Correction of this problem should limit nutrients which might stimulate the growth of bacteria which might consume D.O. in retained waters."

Response: The proper State and Federal agencies have been advised of this problem.

Comment: "4.06 p. 4-6 It seems as if the Monoosnoc Brook tunnel outlet will be within a couple of blocks of Leominster's Main Street and adjacent to Whitney Street, another traffic artery. To what degree will interruptions in normal traffic flow by trucks and construction equipment associated with this project and noise and dust generated by this project impact passing traffic: On windy days, to what extent will people avoid shopping in Leominster because they don't want to fight the traffic? Drive through the dust? Listen to the noise?"

Response: There will be some impact on the downtown area from construction activities; however, it is impossible to predict the exact impact. It would take approximately 8-10 years before any construction could begin. In that time new roads and traffic patterns may emerge and new devices for controlling dust and noise may be found. The Corps does, however, have specifications for construction activities (a copy of these rules are being sent to the League under separate cover); also Corps inspectors will be at the construction site to ensure that regulations are adhered to.

Comment: "4.09-4.11 p. 4-2 A more complete dissolved oxygen (D.O.) study should be performed - more samples - a longer time period of analysis. Perhaps, one sample for each test would control the problem of introduction of oxygen into the samples. How would the Corps redesign the experiment to limit the impact of the introduction of oxygen into the water samples during testing: Please explain the correlation between the data points in Fig. 1



on P. A-15 of the appendix and the data points reported in Table 2 on p. A-14. Using only the data points of Table 2, please explain how the conclusion that the D.O. of the tunnel should not drop below 6.6 mg/l can be drawn. Can you counter the conclusion of Region I of the U.S. EPA that the data points are so scattered that this "conclusion is not warranted?"

Response: Please read the Corps' response to the State of Massachusetts' fourth comment for our reply.

Comment: "6.07 p. 6-1 Could the Corps give us the details as to how it was derived that this tunnel is economically justified? To what extent do you estimate that inflation and cost overruns will increase the estimated cost of the project, \$7,580,000, quoted in your letter to the Bureau of Sport Fisheries and Wildlife in the appendix? How much would it cost to remove silt and debris from Monocoon Brook? If part of the \$7,580,000 were invested in this channel improvement and the remainder of the funds were invested in flood protection insurance, what would be the level of monetary protection for Leominster that such a policy would provide? Who will pay the non-federal cost of each of the following items: land acquisition, damages, and sewer and utility relocations? What types of expenses might be incurred in the damage category? Who will double-check to make certain that the tunnel is being maintained properly? What courses of action would be available to require improved tunnel maintenance should it be found to be insufficient?"

Response: The determination of derived benefits for any flood control project is a function of the amount of damages sustained, frequency of flooding and degree of flooding (i.e. depth of water). Basically, damage-frequency relationship determines annual benefits for the proposed project.

For the Monocoon Brook project, the tunnel bypass, in combination with the existing channel capacity, would be designed to safely convey a Standard Project Flood (SPF) discharge of 4000 cubic feet per second from Rockwell Pond. Although an exact frequency is not assigned to the SPF, it represents the flood discharge that may be expected from the most severe combination of conditions that are characteristic of the region.

The difference between estimated annual losses without the project and residual annual losses to be anticipated with the proposed project in operation is taken as the tangible flood damage prevention benefit. Such benefits amount to \$526,700. In addition, \$76,000 is taken as an area redevelopment benefit, giving a total annual benefit for a 12-foot diameter bypass tunnel of \$602,700.

Estimated total first costs for the proposed project amount to \$7,640,000, amortized over a 100-year period of analysis at an interest rate of 6-5/8%, resulting in an estimated annual cost of \$508,600. (This includes approximately \$1,700 for annual operation and maintenance). Comparing annual costs of \$508,600 and annual benefits of \$602,700 gives a benefit to cost ratio of 1.2 to 1.0.

Cost overruns and the changes in rates of inflation cannot be accurately estimated. Therefore, both costs and benefits are taken as a function of current price levels and worth of property. It is estimated that as inflation increases costs, property values will also rise. Consequently, ten years from now the B/C ratio should not change appreciably.

The cost to remove silt and debris would depend on the amount of material to be excavated. In urban areas the Corps is required to justify a high

degree of protection (SPF) as a lesser project would provide a false sense of security for local merchants and citizens. A simple channel clearing might prevent losses up to the 10 year storm but would not be effective for the larger flood. It is estimated that a 40 to 60-foot wide channel would pass the SPF through Leominster. Although construction costs would be about \$4,000,000 for the channelization project, the cost for lands and damages, as well as disruption to the community, would be excessive. Several buildings located adjacent to the brook would have to be removed to obtain sufficient width.

Under current Corps authorities we are unable to subsidize flood insurance for local property owners. Although this nonstructural plan would shift the burden of cost from the individual to the Federal government, it would not alleviate the hardship and suffering that would accompany recurring flood conditions. Annual costs for flood protection could exceed that of the proposed structural solution.

The city of Leominster would be responsible for any maintenance required. The Corps performs semi-annual inspections to be sure local cooperation agreements are being fulfilled. Legal actions can be taken if the city does not perform acceptable maintenance.

Comment: "7.01 p. 7-1 A mentioned advantage of the tunnel would be to encourage construction along the brook and in flood prone areas. This would seem to be self-defeating. Wetlands areas act as a natural sponge. Placing buildings and pavement on them can reduce their absorptive capacity and thereby increase runoff. Thus, construction in a wetlands area could increase

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the flooding which the Corps says it would like to control. How does this Corps objective fit in with Massachusetts's Inland Wetlands Restriction Act (Chapter 131, Section 40A) and Leominster's floodplain zoning?"

Response: The Corps does not advocate new construction along the brook; this can only be accomplished with State and local authority. As long as these two prohibit construction, it will not occur.

Comment: "9:00 p. 9-1 We are pleased that you plan further meetings on this flood protection project. We feel that the scheduling of public meetings to let residents and town officials know how plans for the tunnel are progressing is important, and we request notice of each meeting, as scheduled, on the Monoosnoc Brook project. When will the next public meeting be scheduled?"

Response: The League, as well as other concerned organizations and people, will be informed through "Public Notices" of any future meetings. But as yet no specific dates have been scheduled. Your request for final EIS will be honored.

k. Mrs. Marilyn G. Clark

Comment: "In Sec. 9.00 on p. 91 the Corps mentioned that further meetings will be scheduled on this project. Because this project directly affects the residents of Leominster, I feel that public meetings or hearings should be scheduled as work progresses in the formulation of the final EIS. It would also be helpful to schedule a hearing on this draft EIS to give residents an opportunity to become better informed about this project and to give residents another avenue of input into the planning process for this flood protection project."

Response: In January 1976, the Corps held a public meeting on this proposed project, and presently do not plan to hold another public meeting before the final EIS is issued. However, we would be willing to meet with concerned citizens on this matter.

Comment: "In a Dec. 21, 1976 letter to your office, Field Supervisor Melvin R. Evans of the New England Field Office (NEFO) of the Bureau of Sport Fisheries and Wildlife commented on the Corps Dissolved Oxygen Study. He stated that 'the assumption that water stored in the tunnel will have a low biological oxygen demand (BOD) may not always occur. It is possible that organic matter, sewage, or other pollutants could enter the tunnel at the end of the high water event, thus adding to the BOD observed during the test, and lowering the DO level below minimum standards.'

"What is your response to this statement? When you redesign this experiment, as appears to be necessary considering the scattering of the data points listed on Table 2 on p. A-14 of the appendix, should tests for D.O. also be run on samples containing organic matter and on samples containing other sources of pollution as well as on samples from the vicinity of the site of the planned inlet for the tunnel? Why? Would you please explain the lack of correlation between the data points in Table 2 and data points in Fig. 1 on p. A-15 of the appendix!"

Why was the Dec. 21, 1976 letter from the Bureau of Sport Fisheries and Wildlife not included in the draft environmental impact statement?

Response: The letter from the U.S. Fish and Wildlife Service was inadvertently left out of the Draft EIS; it will be included in the final. As is stated in this letter, some of the assumptions used may not always be correct.

However, the last paragraph states that the outlet structure should be designed to allow aeration of the water as it is flushed out. The Corps would place blocks in the outlet structure to break up the water's surface, and allow for aeration.

There will be more D.O. studies undertaken in the future, but the Corps still believes our test results are fairly consistent to a theoretical analysis. Please read the Corps response number 4 to the Commonwealth of Massachusetts Executive Office of Environmental Affairs on this matter.

Comment: "In the appendix to the draft EIS, the letter to the NREFO of the Bureau of Sport Fisheries and Wildlife dated Jan. 13, 1977 states that 'preliminary assurances of local cooperation were obtained from the city of Leominster on 1 April 1976.' I hereby request a copy of these assurances. Please also indicate to me the scope of these assurances and also the individuals with Leominster city government who offered their cooperation in this matter."

Response: This information will be supplied. Preliminary assurances were given by Mayor McLaughlin and the City Council by 8-1 vote.

Comment: "In the just mentioned letter, it is also estimated that there will be a non-federal cost of \$600,000 for lands, damages, and utility relocations. Elsewhere in the draft EIS it is mentioned that some sewer lines will need to be relocated. What is the estimated cost of each of these categories? Who will be responsible for paying for each of these categories?"

Response: The estimated cost for land acquisition is \$370,000 and for utility relocation \$150,000. The City and/or State will be responsible for paying these costs.



Comment: "Would the Corps please place a copy of the Values Study for this project at the Leominster Public Library for 1 month so that citizens may review your cost-benefit analysis! Would you please let me know the dates for such a placement."

Response: The Study will be supplied to the library.

Comment: "To what extent would blasting be a part of the tunneling operation? If there were damages to foundations, pipes, utility lines and telephone lines caused by the tunneling operation, who would be responsible for paying for the damages?"

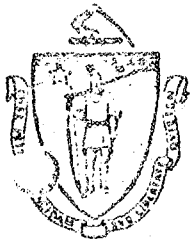
Response: It has yet to be determined if blasting will be used to construct the tunnel. But any damages that might occur would be assumed by the construction company doing the operation, as they are bonded for such damages. However, damages that are not the fault of the Government or the Contractor would be assumed by the city.

Comment: "'Assumed bedrock" is mentioned in Figure 3. To what extent has this bedrock layer been investigated? How precisely can cost estimates be made before a thorough examination of the presumed bedrock layer is made?"

Response: Please read the Corps' response number 3 to the Regional Environmental Council, Inc., on this matter.

Comment: "I look forward to a speedy reply to my questions and comments. Please send me a copy of the final EIS for this project as soon as it is published."

Response: All those who have commented on the Draft EIS will receive a copy of the Final.



# *The Commonwealth of Massachusetts*

*Executive Office of Environmental Affairs*

*100 Cambridge Street*

*Boston, Massachusetts 02202*

EVELYN F. MURPHY  
SECRETARY

April 15, 1977

Mr. Joseph L. Ignazio  
Chief, Planning Division  
U.S. Army Corps of Engineers  
424 Trapelo Road  
Waltham  
Mass. 02154

Dear Mr. Ignazio:

Thank you for sending this office a copy of the Draft Environmental Statement for the Leominster Local Protection Project. The following comments refer to that report.

1. On p.2-4, the present channel capacity of the brook is given as 800cfs. There is no indication of what the channel capacity was at the time of the 1936 flood. More to the point, there is no indication as to whether the 800cfs capacity refers to the channel in its present debris-choked state, or in its proposed cleaned-out state. If the 800cfs refers to the former condition, how would a brook cleaning affect the channel capacity?
2. It is stated on p.4-1 that up to 75% of the labor force employed on the project might be drawn from the local area. Given that most of the project will involve shaft and tunnel construction requiring relatively specialized skills, is this a reasonable figure?
3. The EIS should describe in more detail the plans for construction debris disposal (p.4-2). It should discuss how and where both cleared debris and excavated rock will be disposed of in an environmentally sensitive manner.
4. The discussion of the DO characteristics of water trapped in the tunnel between diversions (p.4-2) is cursory and very unsatisfactory. Aside from its apparent experimental errors, the approach described in the appendix is oversimplified and does not consider such conditions as the high BOD and COD of urban runoff; the oxygen demand of decaying organic matter, such as leaves, which may be left in the tunnel between storms; and a series of storms large enough to produce flow into the tunnel, but not large enough to flush out the tunnel completely. Many towns in Massachusetts have experienced pollution problems from unmaintained catch basins, and the proposed tunnel represents the same problem magnified enormously. Much more thought and study should be given to the biological and chemical impacts of the tunnel on downstream waters.
5. This office is expecting to review a plan for the proposed expansion of the Seawistown shopping center in the near future; this plan includes the relocation

John L. Ignazio  
15, 1977

d diking of the lower end of Monoosnoc Brook. Would this activity, in connection with the Corps' proposed project, lead to more serious downstream flooding problems than described on p.4-3?

"Safety factors" are listed as a long-term impact on p.5-2. What kinds of safety precautions will be taken to prevent injuries related to the intake and discharge structures?

According to the February 1977 Nashua River Watershed Association newsletter, there are firm plans for a city mini-park along Monoosnoc Brook. Any impacts the proposed project would have on this site should be described in the EIS.

The benefit/cost ratio of this project should be stated and explained in the EIS.

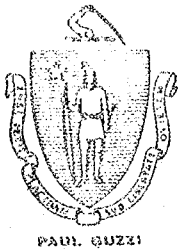
Finally, a minor point: carbon monoxide is not the same as TSP (total suspended particulates) as implied on p.2-3.

Yours truly,



Evelyn F. Murphy  
Secretary

EM/LF



PAUL GUZZI

# *The Commonwealth of Massachusetts*

## *Office of the Secretary*

### *Massachusetts Historical Commission*

*Secretary of the Commonwealth*    *294 Washington Street*    *Boston, Massachusetts 02108*  
*(617) 727-8470*

April 4, 1977

Mr. Joseph L. Ignazio  
Chief, Planning Division  
Department of the Army  
424 Trapelo Road  
Waltham, MA 02154

Re: Monocnoc Brook  
Leominster, MA

Dear Mr. Ignazio:

The Massachusetts Historical Commission has reviewed the Draft Environmental Statement for the above project.

We agree that the project may proceed, providing that further archeological investigations are carried out if the project is authorized as stated on page 2-5, S. 2.30 of the Draft Statement.

Sincerely yours,

*Elizabeth Reed Amadon*

Elizabeth Reed Amadon  
Executive Director  
Massachusetts Historical Commission  
State Historic Preservation Officer

ERA/MBW/mbw



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

March 31, 1977

Mr. Joseph L. Ignazio  
Chief, Planning Division  
U. S. Department of the Army  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, MA 02154

Dear Mr. Ignazio:

We have reviewed the Draft Environmental Impact Statement (EIS) for Monoosnoc Brook Local Protection project in Leominster, Massachusetts and have the following comments to offer for your consideration in preparing the Final EIS.

As in all projects which use inverted syphons, there is a possibility that water stored in the syphon can become anoxic. This could result in objectionable anaerobic gas formation and eventual discharge of oxygen poor water to the receiving stream. This possibility was recognized in the Draft EIS. Comments of this same nature were made with regard to the Pawtuxet River and Furnace Brook Flood Control projects. It is agreed that, due to the relatively high quality of Rockwell Pond water, organic material is probably not present in high enough concentrations to cause sufficient oxygen depletion so as to result in an anoxic condition. However, in view of the erratic test results presented in the draft, it is felt that the EIS's conclusion that "the dissolved oxygen content in the tunnel's water should not drop below 6.6 mg/l" is not warranted. As with the other inverted syphon projects we recommend that some method of tunnel dewatering be provided for and that the tunnel either be dewatered regularly or the water be monitored for D.O. and dewatered as necessary.

Based on EPA's national rating system for EIS's, we have classified this draft as ER-1, a copy of which is enclosed.

-2-

Thank you for the opportunity to review the Draft EIS and we look forward to receiving a copy of the Final when it becomes available.

Sincerely,

*Wallace E. Stickney*

Wallace E. Stickney, P.E., Director  
Environmental Policy Coordination Office

enclosure

## EXPLANATION OF EPA RATING

### Environmental Impact of the Action

#### LO -- Lack of Objections

EPA has no objections to the proposed action as described in the draft environmental impact statement; or suggests only minor changes in the proposed action.

#### ER -- Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating federal agency to reassess these aspects.

#### EU -- Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

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### Adequacy of the Impact Statement

#### Category 1 -- Adequate

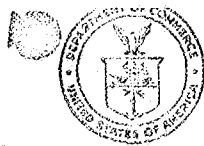
The draft environmental impact statement sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

#### Category 2 -- Insufficient Information

EPA believes that the draft environmental impact statement does not contain sufficient information to assess fully, the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft environmental impact statement.

#### Category 3 -- Inadequate

EPA believes that the draft environmental impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental



April 18, 1977

Mr. Joseph L. Ignazio  
New England Division, Corps of Engineers  
Department of the Army  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Mr. Ignazio:

The draft environmental impact statement for "Leominster Local Protection Project, Monoosnoc Brook, Leominster, Massachusetts", which accompanied your letter of February 22, 1977, has been received by the Department of Commerce for review and comment. The statement has been reviewed and the following comments are offered for your consideration.

- o There is little discussion of costs, compared with benefits, of the proposed project. Although there is reference in Sections 4.03, 4.04, and 4.05 to a 1974 study which determined the costs of flood damage, the only discussion of costs of tunnel construction occurs in Sections 6.06 and 6.07; these Sections, however, are quite vague and give no specific indications of comparative costs of alternative solutions. In Section 6.07, it is stated without justification that the proposed tunnel "is a sound engineering solution, and economically justified." We recommend a more detailed development of costs and benefits.
- o The flood prevention program is based on three recorded floods (1936, 1938 and 1955). There is insufficient analysis of annual rainfall patterns and of the expected magnitude of future major floods.
- o It is stated in Section 7.01 that "The lack of flooding will encourage construction and improvements along the brook and in flood prone areas." But, this seems to be in conflict with the statement in Section 4.16, concerning the Searstown Shopping Center, built on an existing flood plain, that "the tunnel might increase the flooding at Searstown Shopping Center. Since the shopping center is situated on the flood plain between the North Nashua River and the Monoosnoc Brook, there



2.

seemed to be some justification for this concern." Section 4.17, which apparently is intended to answer the question that had been raised in 4.16, is inadequate for that purpose, and should be considerably expanded.

- o It is acknowledged in Section 4.11, concerning the fate of water trapped in the tunnel for long periods of time, and the possibility that oxygen levels might become unacceptably low, that "the tests were only conducted for a short period and there may be some doubt as to the reliability of the reading in the later part of the experiment...." In some years, the water could remain in the tunnel for many months. The consequences of this possibility should be explored further.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight copies of the final statement.

Sincerely,



Sidney R. Galler  
Deputy Assistant Secretary  
for Environmental Affairs



# United States Department of the Interior

GEOLOGICAL SURVEY  
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

In Reply Refer To:  
EGS-FR-77/203  
Mail Stop 760

APR 12 1977

Mr. Joseph L. Ignazio  
Chief, Planning Division  
New England Division  
Corps of Engineers  
Department of the Army  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Mr. Ignazio:

We have reviewed the draft environmental statement for the Leominster project on Monoosnoc Brook, Worcester County, Massachusetts, as requested in your letter of February 22 to the Department of the Interior.

It would be useful if the statement would show the location of the wells used to supply the city in relation to the alignment of the tunnel. The aquifer(s) tapped by the wells should be indicated, especially if they penetrate bedrock. If the wells are in the vicinity of the tunnel site, evaluation of the potential for seepage from the tunnel, and/or perhaps the degree of treatment of the ground water would be appropriate.

Thank you for the opportunity to comment on the draft statement.

Sincerely yours,

  
Acting Director





# United States Department of the Interior

## BUREAU OF MINES

4800 FORBES AVENUE  
PITTSBURGH, PENNSYLVANIA 15213

ER 77/203

March 15, 1977

District Engineer  
New England Division, Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Sir:

Re: Review of Draft Environmental Statement for  
Leominster Local Protection Project, Monoosnoc  
Brook, Worcester County, Massachusetts

The proposed action is the construction of a tunnel 3,200 feet long and 12 feet in diameter to by-pass flood waters around 70 acres of downtown Leominster. The Monoosnoc Brook channel would also be somewhat modified.

Construction of a tunnel of the dimensions proposed would produce about 20,000 cubic yards of excavated material taking into account the swell factor. About 10 percent of this material could be used for grading the Monoosnoc stream channel as part of the overall protection project. Plans for disposal of the rest of the material is left up to the contractor (p. 4-2).

Inadequate consideration is given to the disposal of this quantity of material and how it might effect local crushed stone producers. The proposed action will have no impact on other mineral resources.

Sincerely yours,

*William Cochran*  
for Robert D. Thomson, Chief  
Eastern Field Operations Center





# Regional Environmental Council, Inc.

BOX 255, WORCESTER, MASSACHUSETTS 01613

April 22, 1977

Colonel John P. Chandler  
Division Engineer  
U.S. Army Corps of Engineers  
New England Division  
424 Trapelo Road  
Waltham, Massachusetts 02154

Reference: Leominster Local Protection Project  
Monoosnoc Brook, Leominster Massachusetts  
Draft Environmental Statement-February 1977

Dear Colonel Chandler,

The Regional Environmental Council, Inc. ( REC )  
is a non-profit citizens group concerned with our nat-  
ural environment in the central Massachusetts area, and  
impacts upon that environment.

In reference to the above proposed project, we  
offer the following comments and questions:

1:13- No mention made of how debris, pollutants, etc.  
will be restricted from entering the pipe system, and  
who will be responsible for its maintenance.

1:14- Two city sewer lines must be relocated as part  
of the overall project. The line under the Whitney St.  
bridge presents problems: Where is it to be relocated-  
under the brook?, and will a coffer dam be necessary?  
and will measures be taken to prevent erosion and silt-  
ation ? . Also, approvals will be required from the Div.  
Water Pollution Control and the Leominster Conservation  
Commission, as well as the Corps. Can we assume a suitable  
site for relocation is available?

2:07- Geology is generally described as bedrock covered  
by sand. Figure 3 shows "assumed bedrock" which to us  
indicated somewhat limited core or bore tests were taken  
to locate this rock. To undertake such a large elaborate  
project based on assumptions seems somewhat curious. No  
data on core samples, locations, etc. were noted in the  
Statement.

2:10/11- Waters above Pond are Class A, below Class B,  
indicating nutrients are entering the water, as noted.  
We believe the leak in the sewer line should be repaired  
at once, and certainly before this project is undertaken.

2:24/25- The Corps should insist that the illegal dis-  
charges into the brook be stopped prior to the start of  
the project. We believe also that the entire channel of  
the brook should be cleaned to remove the obstacles  
and debris, and the Corps should receive firm commitments  
that the channel will be kept clean. All illegal dis-  
charges should be stopped by EPA. 43



# Regional Environmental Council, Inc.

BOX 255, WORCESTER, MASSACHUSETTS 01613

Monosnoc Brook-Loominster  
US Army Corps of Engineers  
Draft Environmental Statement

We also noted that Photo 18 location is not identified on sheet entitled "Photo Locations".

4:07- 4:06- Concerning the impact of dust, we believe the Corps has underrated the irritations of dust, and the effects of wind-blown dust, especially on those with respiratory problems. If the dust should blow towards the center of Loominster-already a severely impacted shopping area- the dust would seriously impede and impact what is left of downtown shopping.

Concerning the construction of the tunnel, we assume that the method will be boring, not blasting, although that is not clearly explained. The site chosen for the disposal of the rock is of crucial importance. We assume the Corps and other agencies will carefully select a site with no potential for pollution of the area, and will supervise the disposal carefully.

4:08-11- We have serious doubts about the adequacy, reliability and extent of the tests concerning the anoxia of the waters in the tunnel and their discharge into the brook. We believe much more testing is necessary to ensure that waters discharged into the brook will not impact wildlife in and around the brook. In other locations, we have seen the unfortunate results of discharges of anoxic water into natural streams.

4:12- The filling of a section of Rockwell pond could have serious impacts on plants and organisms which may or may not return after the fill is removed. Also, you do not mention possible changes in currents, nor is mention made of the time period this disruption would take place, a factor with serious implications.

4:17- We note that the flooding of the shopping center would not be relieved by this project since the Nashua waters will be higher and will cause greater damage.

6:07- No mention is made of who will be responsible for the continued maintenance of the tunnel. Will the Corps undertake that responsibility, or the City?? In light of the past and present deplorable condition of the brook, we have little faith that the City can <sup>assume</sup> or wants this responsibility. The tunnel will not work effectively without proper maintenance.

7:01- Construction of buildings on the flood plain is, in our opinion, not desirable in view of the history of destruction of buildings during floods in New England and elsewhere. Further, such construction may be prohibited or restricted by the flood plain provisions of the City's Zoning Ordinance, and/or the federal Flood Hazard Protection Act of 1973, now being implemented by HUD.



# Regional Environmental Council, Inc.

BOX 255, WORCESTER, MASSACHUSETTS 01613

Monoosnoc Brook-Leominster  
U.S. Army Corps of Engineers  
Draft Environmental Statment

Any such construction, if permitted, would have to be flood proof buildings not located in the floodway as mapped by HUD, and carry insurance, all factors which might seriously discourage development of the flood plain.

9:00- We strongly agree that public meetings to advise the status of the project should be scheduled, and we hereby request notice of any further meetings concerned with the Monoosnoc Brook project.

## General Comments:

1. Since this is an environmental report, we note the glaring omission of the Leominster Conservation Commission from your mailing list. We believe, for the mutual benefit of both bodies, that the Corps and the Commission should form a close working relationship. We are certain that the Commission wishes to keep informed on this important proposal. We also request the following to be placed on your mailing list:

(LEOMINSTER)  
League of Women Voters/Land-Use-Water Quality  
Regional Environmental Council  
Nashua River Watershed Association  
Leominster Conservation Commission

2. We also note that this project falls into the category of projects which the Corps designs, engineers, proposes and then is requested to grant a "404" permit for its construction. This places the Corps in the position of judges, prosecutor, defense attorney and jury. A rather interesting conflict of interests which emphasizes the need for the public and concerned environmental groups to know what is going on and why.

Thank you for this opportunity to comment.

Yours very truly,

Lawrence Freed

Chairman,  
Water Quality Committee

c: E. Silver  
Leom. Cons. Comm.  
Leo, LWV  
NRWA  
EPA-Region I



REVIEW OF  
DRAFT ENVIRONMENTAL STATEMENT  
LEOMINSTER LOCAL PROTECTION PROJECT

MONOOSNOC BROOK  
LEOMINSTER, MASSACHUSETTS  
February 1977

The following comments refer to the appropriate sections and page numbers in the text:

2.11 2-3 NRWA also understands that there is a leak in a sewer line under Rockwell Pond. The abundance of vegetation in the pond is indicative of nutrients being added to the water. This discharge should be corrected as soon as possible.

1.12 1-3 Are no cleanout traps to be constructed? How would sediment or debris accidentally entering the tunnel be removed?

1.13 (e) 1-4 How will pollutants be kept out of this catch basin and pipe?

1.13 (e) 1-4 The low area, next to the Pyrotex Corporation building, which is to be drained by a catch basin is currently cluttered with debris and plastic waste materials which are lying in a murky depression of entrapped rain, snow-melt waters, and liquid waste. If the area is to be drained into Monoosnoc Brook, a firm agreement should be reached with the Pyrotex Corporation so that the area can be kept clean to allow for the growth of vegetation and to ensure that drainage water from this area will always be pollution free. The area should also be re-seeded as soon as possible to minimize runoff and to encourage the return of birds and mammals to the area.

1.14 1-4 There is no statement that the City will clean the brook of trash and debris. As indicated in 2.21, Appendix A (Steve Poole Memo), and NRWA observations, this is an aesthetic and hydraulic problem.

2.24 2.25 2-5 If the existing channel is to be cleaned and modified, E. P. A. should make certain that all discharges (principally those of Paragon Plastics) which might be harmful to human or aquatic life are discontinued before any construction begins.

We are concerned, from an aesthetic point of view, that the proposed modifications of the stream channel and the grading of the 3 acres be maintained after the construction period. The channel is presently an eyesore, with all kinds of waste and debris cluttering it. After it is improved, debris and pollution, both industrial and sanitary, should be kept out of the brook.

2.28 2-5 Our concern here is that the outlet site not interfere with animal habitat in the immediate area. Proper landscaping after construction should be sufficient.

4.07 4-2 NRWA shares the Corps of Engineers concern for finding an environmentally acceptable site for the disposal of excavation materials and believe that close supervision by the Corps is necessary to ensure the finding of an acceptable site.

4.08 4-2 Not enough scientific data has been gathered concerning the possibility of retained water in the tunnel becoming anoxic between diversions. The possibility of releasing 360,000 cubic feet of anoxic water into the brook from the outlet site would have serious consequences on plants and organisms present in the channel.

Due to possible adverse impacts from the release of anoxic water into the brook, further controlled studies with a larger sampling technique should be undertaken immediately. In this manner we can be sure of the anticipated values for dissolved  $O_2$  consumption of waters retained over long periods of time.

Note: If there is a sewer leak underneath the pond, the presence of additional nutrients in the retained waters would cause additional  $O_2$  consumption by bacteria present and other environmental problems.

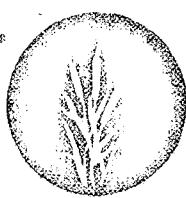
4.12 4-3 The filling in of a portion of the pond may result in unknown adverse effects to the pond such as current changes. Have any studies been completed to determine how long it will take Rockwell pond to revert to its former state after the fill is removed

4.17 4-3 The statement that the tunnel project would not increase the possibility of flooding at the Searstown Plaza because the flood waters of the Nashua would be considerably higher than those of the Monoosnoc, causing more damage, is no solution to the problem of Searstown. It merely shifts the blame for Searstown flooding from the Monoosnoc to the Nashua.

7.01 7-1 The long term goal of the project is to protect downtown Leominster from the threat of flood. It follows, then, that the decreased threat of flood will encourage the development of the existing open flood plains. Much of this area is currently undeveloped. Tough flood plain management must be adopted by the City of Leominster to prevent encroachment by developers along the banks of the brook, if the tunnel project is authorized.

9.00 9-1 A meeting should be held to inform all interested parties and status of the project.





# the WETLANDS PROJECT

3 May 1977

Colonel John P. Chandler  
Division Engineer  
U.S. Army Corps of Engineers  
424 Trapelo Road  
Waltham, MA 02154

RE: Leominster Local Protection Project: Monoosnic Brook

Dear Colonel Chandler,

For the past two and one-half years, the Wetlands Project has been working with government officials, landowners, and developers to protect critical wetlands and flood plains in Massachusetts.

It appears to us that the project at Monoosnic Brook has not been well thought through. There seems to be reasonable doubt in three particular areas as to how thorough the preliminary evaluations have been.

1) In Figure 3, the geology appears not to have been explored thoroughly: we find the legend "assumed bedrock" which can only mean that no one is completely certain of the underlying rock structure. (If this is true, how can accurate cost estimates for the boring of the pipeline be made?)

2) The responsibility of cleaning and maintaining the pipe system has not been taken by either the Corps or the city, yet the system cannot function properly without this maintenance.


3) Testing for the anoxia of the waters does not answer fully questions of the impact of the discharge water on the brook. The testing simply is not adequate.

In an area like Leominster, which is expected to have a serious water shortage by 1990, it seems shortsighted at best to support a project on the basis of its capacity to allow construction on a flood plain, when wetlands and flood plains are such valuable assets to the natural water supply. The same can be said of filling any part of Rockwell Pond. The impact on the water/environmental regime should be further elaborated, e.g. what is the impact on vegetation and wildlife in natural areas which will no longer be flooded as a result of this project?

Further, this tunnelling will not appear to relieve the flooding danger of the shopping center from the Nashua River. A more complete cost/benefit analysis should be presented.

We strongly support the public meetings proposed to advise individuals on the status of the project.

Sincerely,

  
James C. Colman, Director



LEAGUE OF WOMEN VOTERS OF LEOMINSTER

Leominster, Mass. 01433

Review of Draft Environmental Impact Statement

Leominster Local Protection Project

Monoosnoc Brook

Leominster, Massachusetts

February, 1977

The following comments refer to the appropriate sections and page numbers in the text:

1.12-1.13 p. 1-3 Shouldn't there be cleanout traps? How will sediment or debris accidentally entering the tunnel be removed? Where is the provision for dewatering the tunnel either on a regular basis or on the basis of D.O. content?

1.13-1.14 pp. 1-3, 1-4 It is indicated in Sec. 2.21 that trash and debris in the brook have caused localized flooding. Whose responsibility will cleanup on the brook be? The City's? The Corps?

2.11 p. 2-3 If there is a leak in a sewer line under Rockwell Pond, it should be corrected as soon as possible. Correction of this problem should limit nutrients which might stimulate the growth of bacteria which might consume D.O. in retained waters.

4.06 p. 4-6 It seems as if the Monoosnoc Brook tunnel outlet will be within a couple of blocks of Leominster's Main Street and adjacent to Whitney Street, another traffic artery. To what degree will interruptions in normal traffic flow by trucks and construction equipment associated with this project and noise and dust generated by this project impact passing traffic? On windy days, to what extent will people avoid shopping in Leominster because they don't want to fight the traffic? Drive through the dust? Listen to the noise?

4.09-4.11 p. 4-2 A more complete dissolved oxygen (D.O.) study should be performed - more samples - a longer time period of analysis. Perhaps, one sample for each test would control the problem of introduction of oxygen into the samples. How would the Corps redesign the experiment to limit the impact of the introduction of oxygen into the water samples during testing? Please explain the correlation between the data points in Fig. 1 on P. A-15 of the appendix and the data points reported in Table 2 on p. A-14. Using only the data points of Table 2, please explain how the conclusion that the D.O. of the tunnel should not drop below 6.6 mg/l can be drawn. Can you counter the conclusion of Region I of the U.S. EPA that the data points are so scattered that this "conclusion is not warranted?"

LEAGUE OF WOMEN VOTERS OF LEOMINSTER

Leominster, Mass. 01453

6.07 p. 6-1 Could the Corps give us the details as to how it was derived the this tunnel is economically justified? To what extent do you estimate that inflation and cost overruns will increase the estimated cost of the project, \$7,580,000, quoted in your letter to the Bureau of Sport Fisheries and Wildlife in the appendix? How much would it cost to remove silt and debris from Monoosnoc Brook? If part of the \$7,580,000 were invested in this channel improvement project and the remainder of the funds were invested in flood protection insurance, what would be the level of monetary protection for Leominster that such a policy would provide? Who will pay the non-federal cost of each of the following items: land acquisition, damages, and sewer and utility relations? What types of expenses might be incurred in the damage category? Who will pay for the maintenance of the tunnel? Who will maintain the tunnel? Who will double-check to make certain that the tunnel is being maintained properly? What courses of action would be available to require improved tunnel maintenance should it be found to be insufficient?

7.01 p. 7-1 A mentioned advantage of the tunnel would be to encourage construction along the brook and in flood prone areas. This would seem to be self-defeating. Wetlands areas act as a natural sponge. Placing buildings and pavement on them can reduce their absorptive capacity and thereby increase runoff. Thus, construction in a wetlands area could increase the flooding which the Corps says it would like to control. How does this Corps objective fit in with Massachusetts's Inland Wetlands Restriction Act (Chapter 131, Section 40A) and Leominster's floodplain zoning?

9.00 p. 9-1 We are pleased that you plan further meetings on this flood protection project. We feel that the scheduling of public meetings to let residents and town officials know how plans for the tunnel are progressing is important, and we request notice of each meeting, as scheduled, on the Monoosnoc Brook project. When will the next public meeting be scheduled?

Please send a copy to us of your final environmental impact statement for the Monoosnoc Brook Project. We do not see the Leominster Planning Board or the Leominster Conservation Commission on your mailing list for this project. Please send them announcements of all meetings on this project and copies of your final environmental impact statement.

Mrs. Marilyn G. Clark

7 Gordon Street

Leominster, Massachusetts 01453

May 4, 1977

Colonel John P. Chandler

Division Engineer

U.S. Army Corps of Engineers

New England Division

424 Trapelo Road

Waltham, Massachusetts 02154

Dear Colonel Chandler:

Thank you for allowing me the opportunity to review the Draft Environmental Impact Statement for the Leominster Local Protection Project for Monoosnoe Brook here in Leominster, Massachusetts.

In Sec. 9.00 on p. 9-1 the Corps mentioned that further meetings will be scheduled on this project. Because this project directly affects the residents of Leominster, I feel that public meetings or hearings should be scheduled as work progresses in the formulation of the final EIS. It would also be helpful to schedule a hearing on this draft EIS to give residents an opportunity to become better informed about this project and to give residents another avenue of input into the planning process for this flood protection project.

In a Dec. 21, 1976 letter to your office, Field Supervisor Melvin R. Evans of the New England Field Office (NEFO) of the Bureau of Sport Fisheries and Wildlife commented on the Corps Dissolved Oxygen Study. He stated that "the assumption that water stored in the tunnel will have a low biological oxygen demand (BOD) may not always occur. It is possible that organic matter, sewage, or other pollutants could enter the tunnel at the end of the high water event, thus adding to the BOD observed during the test, and lowering the DO level below minimum standards."

What is your response to this statement? When you redesign this experiment, as appears to be necessary considering the scattering of the data points listed on Table 2 on p. A-14 of the appendix, should tests for D.O. also be run on samples containing organic matter and on samples containing other sources of pollution as well as on samples from the vicinity of the site of the planned inlet for the tunnel? Why? Would you please explain the lack of correlation between the data points in Table 2 and the data points in Fig. 1 on p. A-15 of the appendix?

Why was the Dec 21, 1976 letter from the Bureau of Sport Fisheries and Wildlife not included in the draft environmental impact statement?

In the appendix to the draft EIS, the letter to the NEFO of the Bureau of Sport Fisheries and Wildlife dated Jan. 13, 1977 states that "preliminary assurances of local cooperation were obtained from the city of Leominster on 1 April, 1976." I hereby request a copy of these assurances. Please also indicate to me the scope of these assurances and also the individuals with Leominster city government who offered their cooperation in this matter.

In the just mentioned letter, it is also estimated that there will be a non-federal cost of \$600,000 for lands, damages, and utility relocations. Elsewhere in the draft EIS it is mentioned that some sewer lines will need to be relocated. What is the estimated cost of each of these categories? Who will be responsible for paying for each of these categories?

Would the Corps please place a copy of the Values Study for this project at the Leominster Public Library for 1 month so that citizens may review your cost-benefit analysis? Would you please let me know the dates for such a placement.

To what extent would blasting be a part of the tunneling operation? If there were damages to foundations, pipes, utility lines and telephone lines caused by the tunneling operation, who would be responsible for paying for

these damages?

"Assumed bedrock" is mentioned in Figure 3. To what extent has this bedrock layer been investigated? How precisely can cost estimates be made before a thorough examination of the presumed bedrock layer is made?

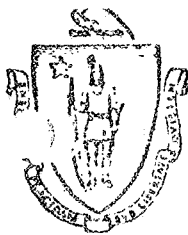
I look forward to a speedy reply to my questions and comments. Please send me a copy of the final EIS for this project as soon as it is published.

Thank you for your cooperation in this matter.

Sincerely yours,

*Mrs Marilyn G. Clark*

Mrs. Marilyn G. Clark



# *The Commonwealth of Massachusetts*

*Executive Office of Transportation and Construction*

*Department of Public Works*

*Office of the Commissioner*

*100 Nashua Street, Boston 02114*

April 12, 1977

Mr. Joseph L. Ignazio, Chief Planner  
Planning Division  
Department of the Army Corps of Engineers  
424 Trapelo Road  
Waltham, MA 02154

Subject: Review of Draft EIS for Monoosnoc  
Brook, Leominster Local Protection Project

Dear Mr. Ignazio:

The Draft Environmental Statement for the  
"Leominster Local Protection Project, Monoosnoc  
Brook, Leominster, Massachusetts", which accompanied  
your letter of February 22, 1977 has been received  
by the Department of Public Works for review and  
comment.

The Statement has been reviewed by the  
Department's Environmental Section in Boston and  
District #3 Projects and Environmental Engineer in  
Worcester and there appears to be no conflict with  
any Department projects in the area.

Thank you for providing the opportunity to  
review this statement.

Very truly yours,

  
John J. Carroll  
Commissioner



# United States Department of the Interior

## NATIONAL PARK SERVICE

### NORTH ATLANTIC REGION

150 CAUSEWAY STREET

BOSTON, MA. 02114

IN REPLY REFER TO:

L-7619-NAR-(PE)

ER-77/203

April 14, 1977

Colonel John P. Chandler  
Division Engineer  
Department of the Army  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Colonel Chandler:

Our Departmental Office of Environmental Project Review has asked us to comment directly to you upon our review of your draft environmental statement (February 1977) for a flood control project of Monoosnoc Brook in Leominster, Massachusetts.

We note on page 2-5 the commitment to a more in-depth archeological survey should the project be authorized. As our Department has reserved the right to comment upon review of the proposal by the Chief of Engineers at a later date, we suggest the commitment to further survey be sustained in the Chief's proposal or an adequate discussion of the outcome of the survey should it be accomplished for any reason prior to finalization of the Chief's proposal.

Sincerely yours,

L. J. Hovig

Acting Regional Director





Advisory Council on  
Historic Preservation  
1522 K Street N.W.  
Washington, D.C. 20005

March 3, 1977

Mr. Joseph L. Ignazio  
Chief, Planning Division  
New England Division  
Corps of Engineers  
U.S. Department of the Army  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Mr. Ignazio:

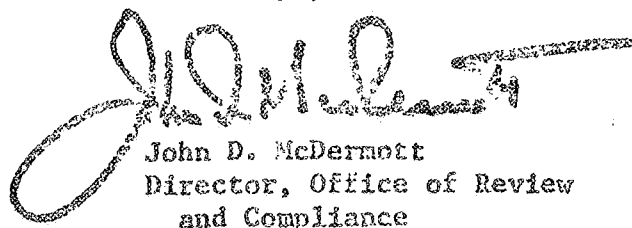
Thank you for your request of February 22, 1977, for comments on the environmental statement for the proposed Leominster Local Protection Project, Monoosnoc Brook, Leominster, Massachusetts.

Pursuant to our responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R., Part 800), we have determined that your draft environmental statement appears procedurally adequate; however, we have the following substantive comments to make:

To ensure a comprehensive review of cultural and historical resources, the Council recommends that the final environmental statement contain evidence of contact with the appropriate State Historic Preservation Officer and a copy of her comments concerning the effects of the undertaking upon these resources.

The Council appreciates the opportunity to review your draft environmental statement.

Sincerely yours,



John D. McDermott  
Director, Office of Review  
and Compliance



IN REPLY REFER TO:

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
One Gateway Center Suite 700  
NEWTON CORNER, MASSACHUSETTS 02158

APR 1 1977

Division Engineer  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, MA 02154

Dear Sir:

The U.S. Fish and Wildlife Service has reviewed your Draft Environmental Impact Statement for the Leominster Local Protection Project on Monoosnoc Brook, Leominster, Massachusetts.

The statement adequately addressed impacts on fish and wildlife resources. Your Final Environmental Impact Statement may wish to acknowledge coordination with this Service, as evidenced by our December 21, 1976 Conservation and Development Report.

Sincerely yours,

ACTING

Regional Director



JOHN B. McLAUGHLIN  
MAYOR

*City of Leominster*  
*Massachusetts 01453*  
*Office of the Mayor*

February 28, 1977

Department of the Army  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, MA 02154

Attn: Joseph L. Ignazio  
Chief, Planning Division

Dear Mr. Ignazio:

I have received a copy of the Monoosnoc Brook draft environmental statement from your office dated February 22, 1977.

I haven't anything to add as far as the statement is concerned. I find, as closely as I can see, the statement to be correct, but would you please correct your records as to the officials of the City of Leominster and the City of Fitchburg on Page ii:

Leominster should read - John B. McLaughlin, Mayor

Fitchburg should read - Hedley Bray, Mayor

Other than that, I find everything to be in order. Thanking you for your interest.

Very truly yours,

John B. McLaughlin  
Mayor

JBMCL/bd



John F. Kennedy Federal Building  
Boston, Massachusetts 02203

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
AREA OFFICE  
BULFINCH BUILDING, 15 NEW CHARDON STREET  
BOSTON, MASSACHUSETTS 02114

April 12, 1977

IN REPLY REFER TO:

1.153

Joseph L. Ignazio, Chief  
Planning Division  
New England Division, Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Subject: Leominster Local Protection Project  
Konoosnoc Brook  
Leominster, Massachusetts

Dear Mr. Ignazio:

The Boston Area Office of HUD has reviewed the above Draft Environmental Statement, which was sent to the Regional Office of HUD, and finds no conflicts with its objectives.

Thank you for giving this office the opportunity to review and comment on the above statement.

Sincerely,

*Joseph L. Ignazio*  
Acting Area Office Director  
DEPUTY



# United States Department of the Interior

## BUREAU OF OUTDOOR RECREATION

NORTHEAST REGIONAL OFFICE

Federal Building - Room 9310

600 ARCH STREET

Philadelphia, Pennsylvania 19106

IN REPLY REFER TO:  
4120

March 22, 1977

Mr. Joseph L. Ignazio  
Chief, Planning Division  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Dear Mr. Ignazio:

This is in response to a February 22, 1977 letter to the Department of the Interior, Office of Environmental Project Review, requesting comments on the draft environmental statement for the Leominster Local Protection Project, Monoosnoc Brook, Leominster, Massachusetts. At this time, we are unable to provide comments because our manpower and funds are committed to other ongoing activities.

Sincerely yours,

JAMES J. DONOGHUE  
Assistant Regional Director



APPENDIX A



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
New England Field Office  
P. O. Box 1518  
55 Pleasant Street  
Concord, NH 03301

December 21, 1976

Division Engineer  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, MA 02154

Dear Sir:

This is our revised Conservation and Development Report on your flood control local protection project on Monoosnoc Brook at Leominster, Worcester County, Massachusetts. This project was planned under authority contained in the February 9, 1961 Resolution of the Senate Committee on Public Works, authorized by the Flood Control Act of 1966, P.L. 89-789, and restudied at the request of local officials.

This report is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), and supercedes our Conservation and Development Report of October 2, 1964.

We understand the proposed project calls for a subsurface diversion tunnel 3,400 feet long by 12 feet in diameter, from Rockwell Pond to just downstream of the Water Street Dam, in the City of Leominster. Other project features would consist of an inlet structure in the eastern corner of Rockwell Pond, and an outlet structure in a wooded lot adjacent to Monoosnoc Brook several hundred feet downstream of the Water Street Dam. Water will enter the tunnel inlet when flows out of Rockwell Pond exceed 70 cubic feet per second, with the tunnel capacity being 3,100 cubic feet per second. Tunnel use is expected to occur three to four times per year, and water remaining in the tunnel will not be pumped out, but flushed out with the next use.

No long term adverse effects at Rockwell Pond are expected to occur as a result of construction and operation of the project. Monoosnoc Brook is stressed by pollutants from industries in the project area, but sampling by the Massachusetts Division of Fisheries and Wildlife indicates a fairly diversified population of warmwater fish species, including the

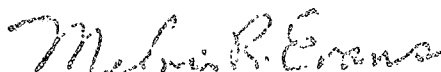


white sucker, fallfish, pumpkinseed, common shiner, yellow bullhead, blacknose dace, and largemouth bass. Benthic food organisms are also present.

The project as presently proposed seems to be a good solution to the flooding problem from a biological perspective, since no stream channelization is involved and other perturbations are minor. One concern we do raise is the quality of the water, stored in the tunnel between use, and its effects on Monoosnoc Brook after it is flushed out. Although preliminary studies on effects of water storage on dissolved oxygen (DO) concentrations have shown a minimum of 7 mg/l will remain in the water, these studies depend on several assumptions which may not always be true. Specifically, the assumption that water stored in the tunnel will have a low biological oxygen demand (BOD) may not always occur. It is possible that organic matter, sewage or other pollutants could enter the tunnel at the end of the high water event, thus adding to the BOD observed during the test, and lowering the DO level below minimum standards.

Since Monoosnoc Brook will be stressed in any event during flood flows, we do not feel tunnel pumpout devices are necessary. However, we do recommend that the tunnel outlet be designed to aerate the water as it is flushed out. This should provide reasonable assurance that oxygen deficient water is not returned to Monoosnoc Brook.

Sincerely yours,



Melvin R. Evans  
Field Supervisor, NEAO

RSS/bmk:MRE

cc: RO, AEV



EXECUTIVE OFFICE OF THE PRESIDENT  
COUNCIL ON ENVIRONMENTAL QUALITY

722 JACKSON PLACE, N. W.

WASHINGTON, D. C. 20006

FEB 10 1976

MEMORANDUM FOR HEADS OF AGENCIES

SUBJECT: Environmental Impact Statements

During the past year the Council on Environmental Quality has conducted a review of federal agency implementation of the environmental impact statement (EIS) requirement of the National Environmental Policy Act (NEPA). That review has indicated that federal agencies have increasingly used the EIS process successfully as a means to improve decisions affecting the environment. Nevertheless, situations continue to arise in which the impact statement process has been more an appendage to or justification for decisions already made than an aid to decisionmaking. Frequently these failures have been caused or aggravated by the inordinate and unnecessary length of EISs. Such documents at best obscure the intent of NEPA and can be extremely harmful to the environmental impact statement process. It is the purpose of this memorandum, therefore, to reemphasize to all agencies the Council's position on the appropriate focus, use and length of environmental impact statements in the federal planning and decisionmaking process.

An unnecessarily large portion of many EISs has been devoted to descriptions of the proposed action and the existing environment. Frequently, EISs follow lengthy, detailed outlines in order to assure that at least some treatment, however brief, is given to every subject conceivably relevant to the proposal. In following this approach agencies make little or no attempt to rank and then analyze in depth the most significant environmental impacts.

There are several reasons why EISs have taken this course: some EIS authors believe that the EIS itself should be a comprehensive, highly technical, scientific document; the voluminous material received by an agency from an applicant or consultant may prove too time-consuming to edit; or an agency's lawyers may recommend coverage of every possible contingency, particularly if the agency should be sued. The adequacy of an EIS is then measured by its length.

These reasons, however, ignore the precept that the EIS is not an end in itself but is primarily intended to aid decisionmaking. The statement does not achieve this purpose when it has such prodigious bulk that, while it may serve some academic purpose, no one at the decisionmaking level in any agency will ever read it. Since its purpose is to clarify, not obscure, issues and to forecast and analyze significant impacts of a proposal and its reasonable alternatives, efforts must be made early in the EIS process to weed out unnecessary information. Then, by focusing effort and attention on meaningful analyses, the legal adequacy of an EIS will also be supported and enhanced.

It is the Council's position, therefore, that descriptions of the existing environment and the proposed action should be included in an EIS only to the extent that they are necessary for a decisionmaker to understand the proposal, its reasonable alternatives, and their significant impacts. The EIS should explain how the scope of the statement and its level of detail have been carefully delineated in accordance with the significant environmental issues and problems foreseen by the agency. Data and analyses in an EIS should consequently be commensurate with the importance of the impact as determined by the agency's environmental analysis. Less important material should be summarized, consolidated or simply referenced.

These strictures are set forth in section 1500.8(a)(1) of the CEQ Guidelines on preparation of impact statements which states that descriptive material in an EIS should be:

"adequate to permit an assessment of potential environmental impacts by commenting agencies and the public. Highly technical and specialized analyses and data should be avoided in the body of the draft environmental impact statement. Such materials should be attached as appendices or footnoted with adequate bibliographic references. The statement should also succinctly describe the environment of the area affected..."

Section 1500.8(b) states that in developing the EIS

"...agencies should make every effort to convey the required information succinctly... giving attention to the substance of the information conveyed rather than to the particular form, or length, or detail of the statement."

"This section states further that each of the five points required by NEPA in an EIS

"...need not always occupy a distinct section of the statement if it is otherwise adequately covered in discussing the impact of the proposed action and its alternatives -- which items should normally be the focus of the statement."

In reemphasizing the policy behind these sections of CEQ's Guidelines it should be noted that the need for manageable and useful statements does not and should not imply a need or opportunity to reduce the quality or specificity of environmental research or study required for an informed decision. Environmental conclusions expressed in an impact statement must still be logically supported by references to standard texts, scientific literature, appendices, special studies, or textual material within the statement. Specific baseline inventories and environmental research will often be needed initially to determine if there are environmental problems that should be analyzed in an impact statement. While these studies should be made available to the public and, in the case of a legal challenge, to the courts, they should be referenced, rather than simply reproduced, in the EIS itself.

Although the value of the environmental impact statement process to federal agency decisionmaking has been demonstrated in the past, improvements in its application are necessary. Specific efforts to use the impact statement as a management tool, and to focus the statement on analyses of impacts of a proposal and its reasonable alternatives will require the attention and understanding of agency leaders at various levels. The Council will be glad to assist these efforts in any way that it can.

*Russell W. Peterson*

Russell W. Peterson  
Chairman

APPENDIX B

THE FEDERAL WATER POLLUTION CONTROL ACT  
SECTION 404 EVALUATION

LEOMINSTER LOCAL PROTECTION PROJECT

LEOMINSTER, MASSACHUSETTS

DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASSACHUSETTS 02154

MAY 1978

Section 404(b) of the Federal Water Pollution Control Act Amendments of 1972 require that an evaluation be made of the impacts dredging or filling would have on waters of the U. S. The following is such an evaluation for Leominster Local Protection Project in Leominster, Massachusetts:

To protect the City of Leominster from flooding, it is proposed to divert excess waters from Rockwell Pond to Monoosnoc Brook by use of a tunnel running under the city. The project would include the following: (1) a concrete lined tunnel 3,200 feet long and 12 feet wide, (2) a capped inlet structure at Rockwell Pond, (3) a concrete flume outlet structure and stone riprap along the outlet channel's slopes, (4) decreasing the length of the existing weir at Rockwell Pond, and (5) grading of approximately 3 acres of streambank that is presently a catch basin for flood waters.

The system would operate as follows: as flood waters increase at Rockwell Pond, all but 600 cfs of flow would go into the inlet structure; the flood waters would then move through the tunnel and would be discharged into Monoosnoc Brook below the central business district.

#### 230.4-1 Physical and Chemical-Biological Interactive Effects.

##### (a) Physical Effects

In constructing the project, a small portion of Rockwell Pond would be filled. The fill is necessary for the construction of a diversion tunnel from the pond to Monoosnoc Brook. The filling operation would result in the loss of the benthic community at the fill site, and would also reduce the productivity in the pond's water by reducing the amount of light penetration. These impacts would last for about two years while construction occurs. After this period, the fill would be removed, and the pond should revert to its former state. In addition, 3 acres of stream bank would be graded. This area is an intermittent catch basin for flood waters. Although the area could be considered a wetland, it would not be considered productive; therefore, the grading of this area would not impose severe environmental impact.

##### (b) Chemical-Biological

No impact on the biota since clean fill would be used.

##### (c) Site comparison

Not applicable since only one site would be used, and it would not be a permanent fill site.

#### 230.4-2 Water Quality

No permanent water quality changes would result due to the construction of the tunnel. However, between diversions water would be retained in the tunnel; when this water is discharged into the brook during flooding, a reduction in the dissolved oxygen content might occur. The reduction should not go below 5 mg per liter of dissolved oxygen as required for class "B" waters--as Monoosnoc Brook is classified.

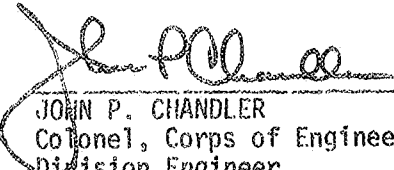
#### 230.5 Disposal Sites

The excavated material from the tunnel and the fill material from the pond would require disposal. Presently, the Corps is unable to specify exactly how or where the material would be disposed. However, a standard clause placed in Corps specifications reads "The Contractor and his subcontractors shall comply with all applicable Federal, State, and local law regulations concerning environmental pollution control and abatement." Massachusetts has enacted many laws concerning sensitive environmental resources. Should the disposal of the material impinge upon any of these sensitive resources, the State, and likely the local government, depending upon the specific law, would have regulatory authority over this action and full-time inspection of the Contractor's disposal methods would be accomplished by Corps representatives.

#### Conclusion

In accordance with the provisions of EC 1165-2-125, 31 January 1977, I have reviewed this "404" evaluation. From this review, I have determined that no significant adverse impacts to water resources should result from the Leominster Local Protection project as described.

3 May 1978  
(Date)

  
JOHN P. CHANDLER  
Colonel, Corps of Engineers  
Division Engineer